Title: Button Bonanza

Brief Overview:

This concept development unit develops students understanding of collecting and analyzing data. Students will create various stem and leaf plots to graphically represent data. They will have an opportunity to decide the best method of running their own "Button Boutique" by producing a button bug independently and then in an assembly line. The skills taught using various forms of button data. The students will use information gathered to determine the median and mode of a set in order to describe what is "typical" in a data set. Students will also describe "gaps" in a set of data. During the data analysis throughout the unit, students will be able to determine how data can effect real life decisions.

NCTM Content Standard:

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them:

- Collect data using observations, surveys, and experiments;

Select and use appropriate statistical methods to analyze data:

- Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed;
- Use measures of center, focusing on the median, and understand what each does and does not indicate about the data set;
- Discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatter plots.

Grade/Level:

4^{th} – 5^{th} Grade

Duration/Length:

3 60 minute classes

Student Outcomes:

Students will:

- Collect data
- Create stem and leaf plots
- Analyze stem and leaf plots

- Calculate the mean
- Identify the median and mode

Materials and Resources:

- Day 1 student and teacher resources
- The Button Box by Margarette S. Reid
- Graph paper or lined paper
- Collection of buttons
- Day 2 student and teacher resources
- Computer with internet access
- Button Bug supplies – buttons and pipe cleaners
- Stopwatches
- Music
- Day 3 student and teacher resources
- Centimeter rulers
- Tape
- Identical Buttons
- Index cards
- Unifix cubs
- New pencils
- Push pins
- Scissors
- Grandma and her Button Jar by Gloria Healy

Development/Procedures:

Day 1

Pre-assessment

- Give students a 6 question Pre-Assessment that includes parts of a graph, types of graphs, median, mode, range, interpreting a stem and leaf plot and analyzing information that is found in a stem and leaf plot. Allow 5 minutes to complete the pre-assessment and review the answers together in class.
- Use the information collected in # 5 and # 6 (Stem and Leaf Plot) in order to determine your students' ability to interpret and analyze stem and leaf plots. An answer key is provided.

Engagement

- Distribute the Button Survey to all of the students and allow them to work with a partner for 2 minutes to calculate the number of buttons that they have on their clothing.
- Create a class line plot with the data: Determine the range of the data by asking a student the total buttons on his/her clothing. Quickly survey the class to find the

person with the least number of buttons and the person with the highest number of buttons. This information will help in making the line plot. Put the line plot on the board and have the students place a sticky note above the number of buttons they had in their total box.

- Analyze the information by asking questions: Do you see any clusters in this data? Why do you think that most people had ___? If we did this survey during a different time of year or season do you think we would get different results? ALWAYS ask students to explain using math vocabulary.
- Introduce our activity for the day by asking the students some of the things that they like to collect and what are some of the things that they like to do with them. Read aloud The Button Box by Margarette S. Reid ISBN: 0-14-055495-5 to the students.

Exploration

- Distribute a Button Number card to each student and instruct students to turn and talk to their partners about their number, what the place value of the digit on the left is and the digit on the right is, and decide which partner has the larger number.
- Challenge the students to get in order according to their Button Number. This should create a long line of students and take quite a bit of space. Interrupt and say: I have an idea of how to arrange this information so that it won't take up quite so much room.
- Cut the Button Number apart between the tens digit and the ones digit.
- Draw two lines for a stem and leaf plot on the board.
- Model using your Button Number how to place the two digits on the grid with the tens on the left side and the ones on the right side.
- Call a student to the board to add their Button Number to the plot and guide with questions: Is your tens place digit larger or smaller than mine? Should it go above or below mine? Does it matter where the ones digit goes?
- Discuss what to do if the tens digit is the same number and explain that since we already have that digit on the board we can just put our button right on top but there will be a ones digit for each piece of data collected.
- Continue until each student gets to place their Button Number on the board.
- Congratulate the students on their creation of a stem and leaf plot

Explanation

- Define the stem and leaf plot by explaining how all of the information was arranged. Our tens digits are arranged in numerical order and they could go up or they could go down. There is a ones digit for each piece of data collected and the ones digits should be in numerical order from left to right.
- Create a key to help interpret the plot. Provide practice for the students in reading the different pieces of information. Finally, add a title to complete the line plot.
- Model how to create a stem and leaf on paper (graph paper may be helpful for organization and spacing) by using additional button numbers.

- Find the mode by locating a single line that has a repeated ones digit. Define the mode as a number that occurs most often in a single date set. There could be more than one mode in a data set or there could be no mode.
- Use the Colored Button template to create "Bouncing Buttons" to find the median in the data. One student starts with the colored button on the lowest piece of data and the teacher starts with the colored button on the largest piece of data and they bounce to the next data value at the same time in order to find the median number of the data sat (the number in the middle).

Extension

- Allow each student to get a competitive handful of buttons from the button box. Define a competitive handful as a one-handed grab that the student could carry back to their desk without dropping any button on the floor.
- Have the students count the buttons that they were able to hold.
- Students should count their buttons and add their data to the button count box on the board.
- Set up graph paper to create a stem and leaf plot and include the tens range on the chart
- Have students complete the stem and leaf plot in partners or groups. Include the key and title.
- Share the information by having students take turns completing the stem and leaf on the overhead or document camera.
- Pose questions to assess student understanding. Ask, "What do you notice about our data? What do all of these (ones side of the plot) digits represent? Is there a mode in this data set? What is the median of this data set? Do you think this stem and leaf would look differently if you were a first grade class?"

Differentiation

- Reteach
  - Students who have not demonstrated mastery need to be assessed for place value misconceptions.
  - Use a set of Button Numbers and highlight or color the tens digits all the same color. Scramble the buttons and place in piles according to the tens digit. Make a line for each pile in order according to the ones digit. Cut and move all the tens digits to the left side.
  - Find the median on a stem and leaf plot using an actual button to move through the columns in the correct order.

- Enrich
  - Use the poem Grandma and her Button Jar by Gloria Healy and a data set of student reading times to create a stem and leaf plot independently.
  - Challenge students answer specific questions about the stem and leaf plot to determine how many words the typical student can read in one minute.

Evaluation

- Have students complete an Exit Ticket with a stem and leaf about scores on a math test.
- Students will answer all four questions including a written response to determine if additional information will change the median. An answer key is included.

Day 2

Engagement

- Brainstorm things that students can build by themselves or with a helper. Use an organizer to collect the information
- Definitions: One person working alone is called a single craftsman. What are some good things about working with on a project alone? What are some negative aspects? Two or more people could work together on an assembly line. What are some positive things about working with a friend or a group? What are some things that could make it harder?
- Watch the I Love Lucy Assembly Line Video – that can be found at the following web address.
  http://www1.teachertube.com/members/viewVideo.php?title=i_love_lucy&video_id=223213

Exploration

- Distribute the Button Bugs supplies and directions and explain that they are going to be single craftsmen for a company that builds creatures called Button Bugs.
- Have students read through the directions and check the supplies. Then construct a button bug together as a class to make sure that everyone understands the company expectations for the Button Bugs that they will be selling.
- Gather data for the Button Bugs Boutique (resource) on how long it takes to make a single Button Bug working in groups of two with one person building the bug and the other student using a stopwatch to time (in seconds) how long the bug takes to build. Each student should build twice and record their times on the board.
- Create a stem and leaf plot for the data collected on one side of a Back to Back Stem and Leaf Template and analyze the data: How many seconds did it take the typical student make? Do you think the company would be happy with uour results? How could you improve your times?
- Arrange students in groups to create an assembly line. Give 5 minutes for students to discuss a strategy for putting together their bugs in an assembly line. Remind them that they will need a timer and a recorder for their data.
- Students should work together to create a button bug in an assembly line and time how long it takes to make a bug to the nearest second. Repeat this activity until each group has completed 5 bugs and has recorded their times on the board. A resource sheet is provided to record data.

Explanation

- Ask: How could you compare this new assembly line data to the data that you collected when one person was creating the button bug. Say: I can show you a

way to compare the data without making a new stem and leaf. Use the template provided.

- Model how to create a back to back stem and leaf plot using the stem and leaf plot from the single craftsmanship Button Bug. The tens column will stay the same and the ones column will go from right to left. Model and guide the students as they add the rest of the data. Create a key for the left side of the stem and leaf plot.
- Compare the two sets of data: How many seconds did it take to make the Button Bugs with an assembly line. Do you think the company would prefer the single craftsman or the assembly line? What if we changed the Button Bugs so that everyone looked different … how might that change our data? Which method do you think would be more beneficial for the Boutique if they wanted more original Bugs to sell?

Extension

- Have students create a back to back stem and leaf plot using the scores from two popular sports teams working in cooperative groups.
- Compare the results from the stem and leaf plot in order to decide which team to route for in the coming sports season. A resource sheet on the Washington Redskins and the Baltimore Ravens is provided.
- Suggested website: The football Database http://www.footballdb.com

Differentiation

- Reteach
  - Students can create a back to back stem and leaf plot on a poster and use the buttons to interpret both sides and use stem and leaf vocabulary (digits, ones, tens, key, median, etc)
- Enrich
  - Students can invent a new design for the Button Bug Boutique that you believe would still interest customers but would be faster for the assembly line.
  - Students may work with a test group to test your design and record the data. They can compare with another group's data and create a back to back stem and leaf plot. Students will use their findings to write a persuasive paragraph to the Button Bug Boutique

Evaluation

- Have students do "Hand up stand up pair up." Each student stands with their hand up and starts to walk around the room when music plays. When the music stops the students freeze and clap 5 with the student that is nearest to them. Give them a discussion topic and the students will volley back and forth with the information that they know about the topic. Topics: Explain how to make a back to back stem and leaf plot. Give reasons why a person would want to compare data this way. What are the advantages of using a stem and leaf plot?, What are the disadvantages of using it?

- Persuasive paragraphs will be read for math language and an understanding of how to analyze the information given. Look for misconceptions of what the company is looking for (fastest times not largest) and misreading of the information (back side of the stem and leaf plot).

Day 3

Engagement

- Display a fun fact card (student resource) that is folded from the bottom to hide the question. Have the students predict what the question is for the answer that they can see.

Exploration

- Conduct an investigation to gather data for the creation of a stem and leaf plot. Partner up the students and give each group identical buttons. Use tape to create a line on a desk or on the floor. Direct the students to place their buttons on the starting line and use one blow to move the button as far as possible. The other student will use a centimeter ruler and record how far the button was pushed by the blow (measure to the nearest cm). Each student will do this activity five times. Students will create a stem and leaf plot that displays the class data. Data will be recorded on the student resource, Button Blowout.

Explanation

- Challenge students to analyze the class stem and leaf plot by identifying the median and the mode for the set of data.
- Ask: What is the typical distance the button will travel if blown by a 5^{th} grade student? Discuss what typical means and what it could mean in reference to a stem and leaf plot. Discuss which measure of centr best represents the data set.
- Discuss how students could decide what the typical distance is for the data set.
- Allow the groups to determine what the typical measurement for the button was in their data set. Allow groups to share their ideas and explanations.

Extension

- Set up a gallery walk of six stem and leaf plots around the classroom and give each student six index cards which they will write their name ons. They will then move around the room and examine each stem and leaf plot. They will then have to decide which measure of center they would use to find the typical data and then write median, mode, or mean on their index cards. They will then place the index cards in the paper bag near the stem and leaf plot.
- Assign each group of 4 students a stem and leaf plot. Together they will discuss the stem and leaf plot and determine how they would find the typical measurement.
- Share aloud the group decision and justification. Each group will then receive the bag of votes and announce whether the class agreed of if they disagreed.

Differentiation

- Reteach
  - Allow each student to grab a handful of Uni-fix cubes to create a tower. Tell students that every tower is a different height but they can find the mean by redistributing the cubes to create an equal length for everyone. Students share and trade in order to make equal towers and therefore identify the mean in a concrete way..

- Enrich
  - Students will construct a pinwheel and conduct an investigation to gather data. Give each student a copy of Pinwheel Extension Activity Data Sheet, Data Sheet Part II and Pinwheel Patterns.
  - Blow the pinwheel to make the blades spin while your partner counts how many revolutions the blades make. Record your data on the data table provided.
  - Create a stem and leaf plot to display the information and answer a BCR to explain how to find the typical number of spins that the pinwheel will make when you blow on it

Evaluation

- Have students analyze two stem and leaf plots about two different factories in a community. Write a letter to the president of the factory including their analysis on efficiency and offer suggestions to increase production.

Summative Assessment:

This assessment consists of a data collection which the students will be using to create a back to back stem and leaf plot and answer analysis questions. It will include a BCR/ECR that will allow students an opportunity to explain their conclusions and decisions using math concepts and vocabulary. An answer key is included.

Authors:

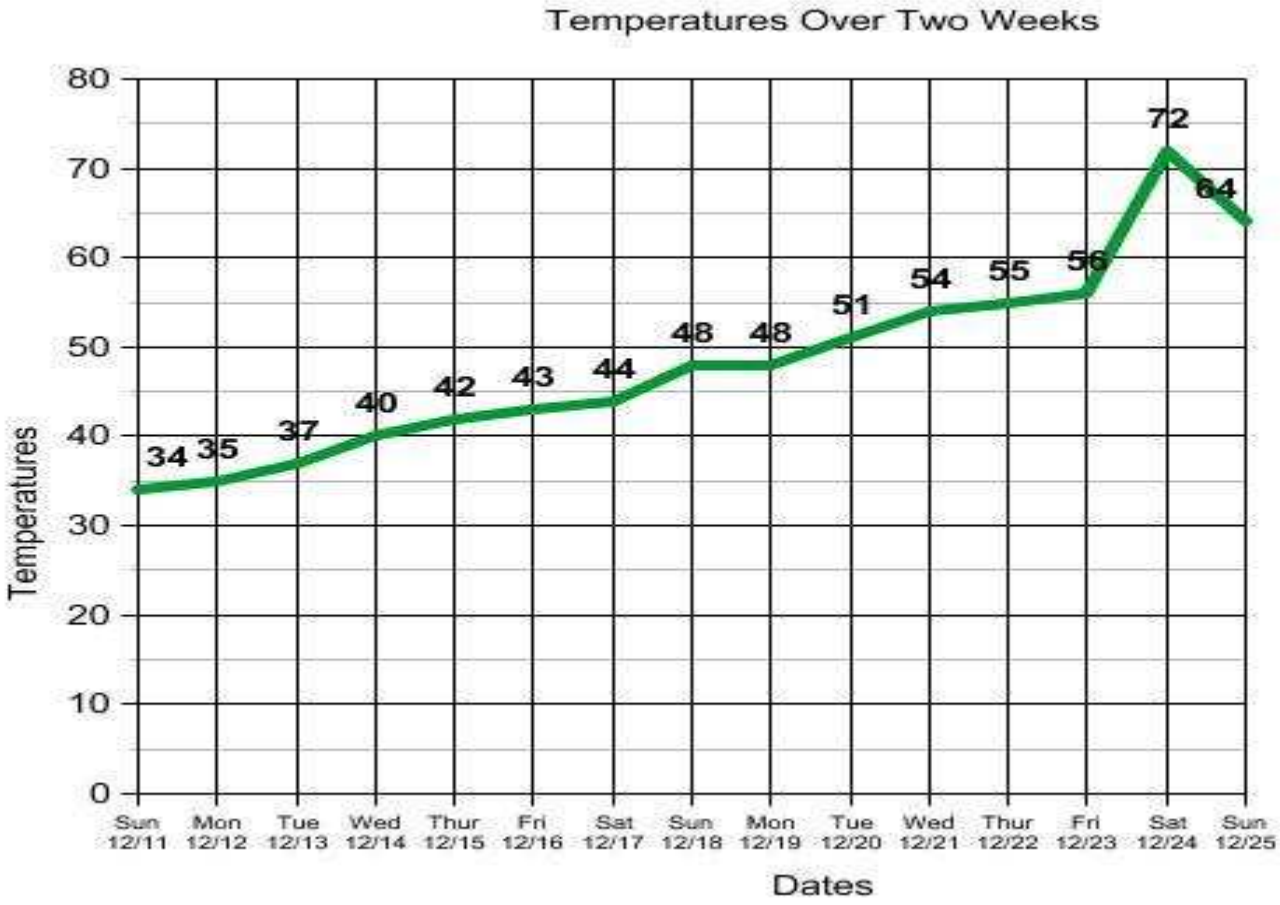
Michelle Cummings
Reisterstown Elementary
Baltimore County

Patricia Medeiros
Tracey's Elementary
Anne Arundel County

Name: _____ Date: _____

Buttons Pre-Assessment

Use the graph below to answer the following questions.



1. What type of graph is displayed? _____

2. What are the five main components of the graph?

   _____

   _____

   _____

3. What is the median temperature? _____ What temperature is the mode?_____

4. What is the range of temperatures over the next two weeks? Show your work._____

   _____

Temperatures over a Two Week Period

3	4 5 7
4	0 2 3 4 8 8
5	1 4 5 6
6	4
7	2

Key 3 / 4 = 34

5. What is mode of the data? _____

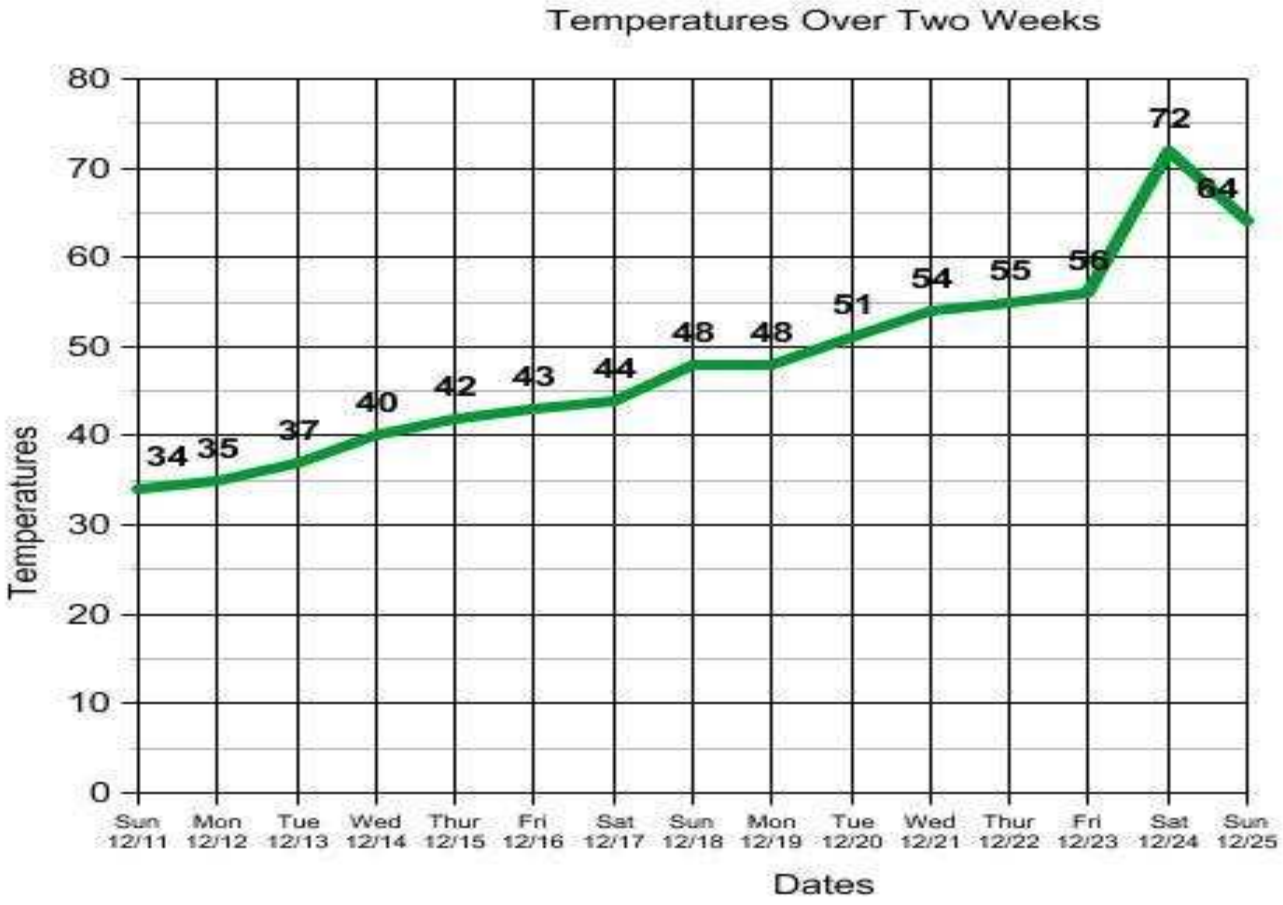
6. How are the numbers on the left side of the table related to the numbers to the right side of the table? _____

_____

Name: _____ Date: _____

Buttons Pre-Assessment

Use the graph below to answer the following questions.



7. What type of graph is displayed? _____A line graph_____

8. What are the five main components of the graph? TAILS – Title-Axis-Intervals-Labels-Scale

9. What is the median temperature? __48___

10. What temperature is the mode?___48____

11. What is the range of temperatures over the next two weeks? Show your work. The range is 38. (Numbers or symbols) 72 – 34 = 38 or I took the highest temperature which was 72 degrees and I subtracted the lowest temperature which was 34 degrees and I got a difference of 38 degrees and that is the range.

Temperatures over a Two Week Period

3	4 5 7
4	0 2 3 4 8 8
5	1 4 5 6
6	4
7	2

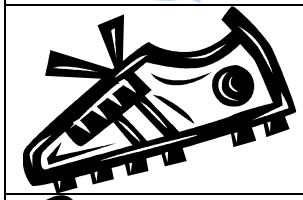
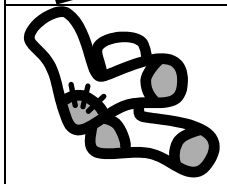
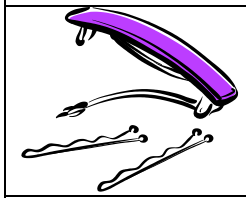
Key 3 / 4 = 34

12. What is mode of the data? ___48____

13. How are the numbers on the left side of the table related to the numbers to the right side of the table? __Answers will vary. Key components – place value concepts (tens on the left and ones on the right), number concepts (tens are organized with smallest number on the top and largest number on the bottom, ones are arranged in numerical order from smallest to largest)

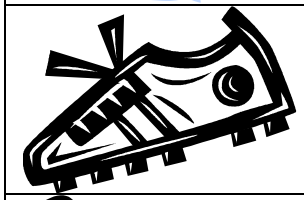
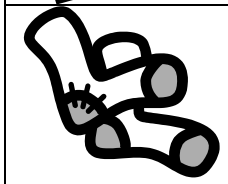
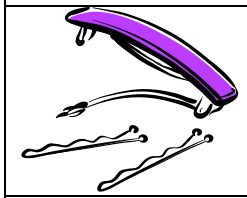
Name_____ Date_____

BUTTON SURVEY:

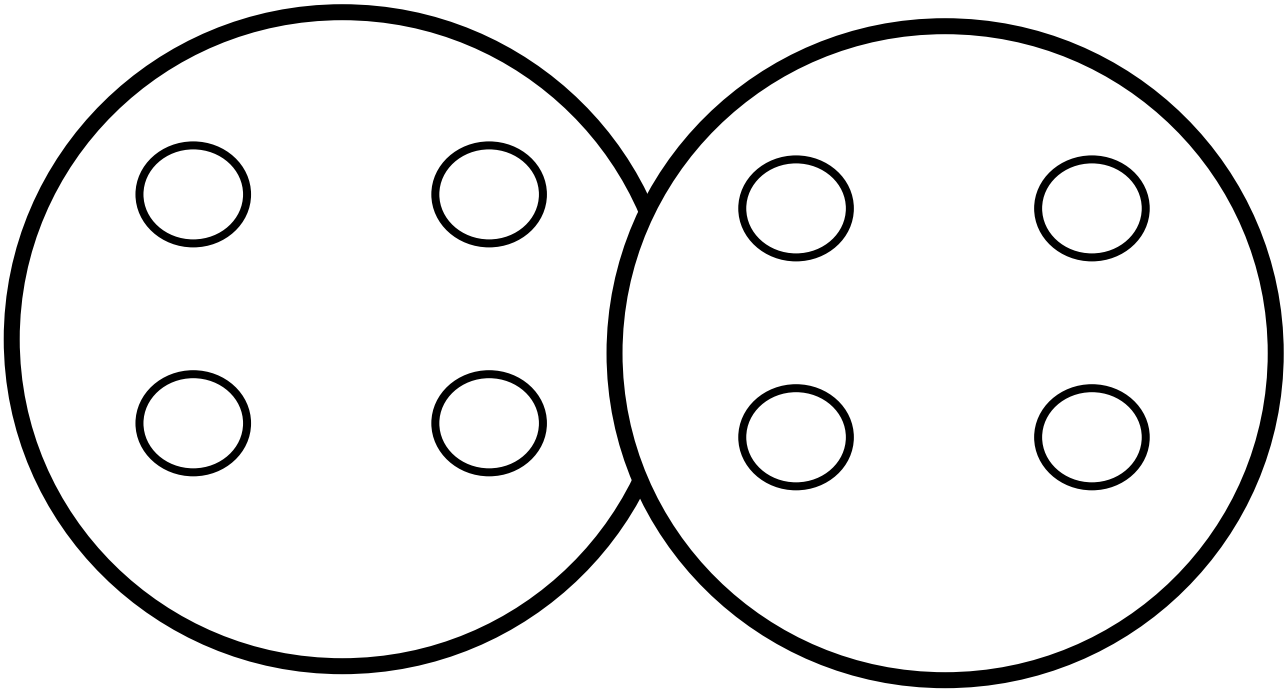
Article of Clothing	Number of Buttons
	
	
	
	
	
OTHER	
Total	

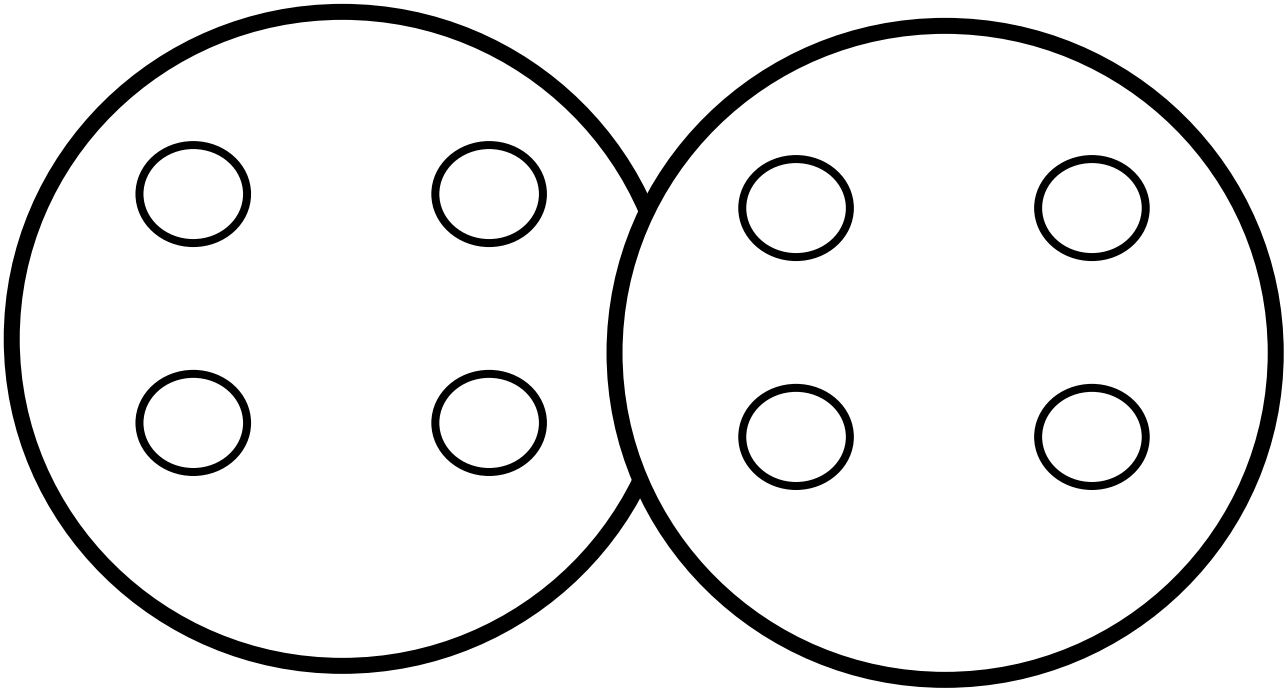
Name_____ Date_____

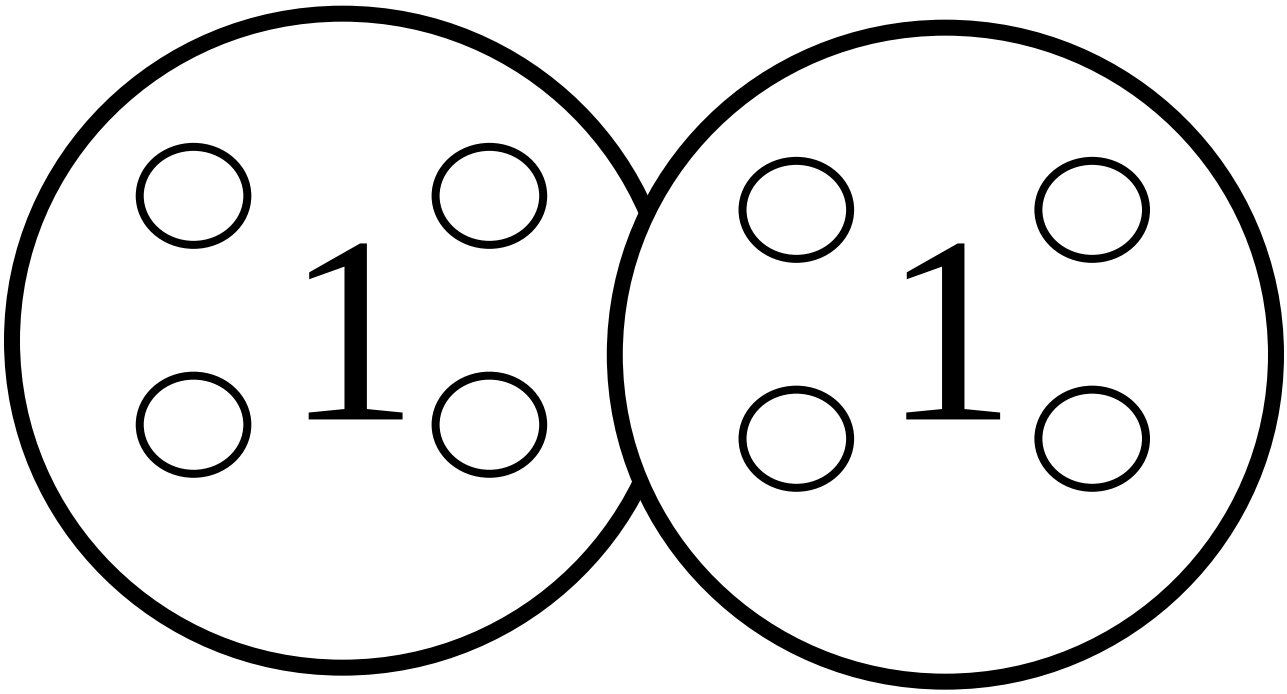
BUTTON SURVEY:

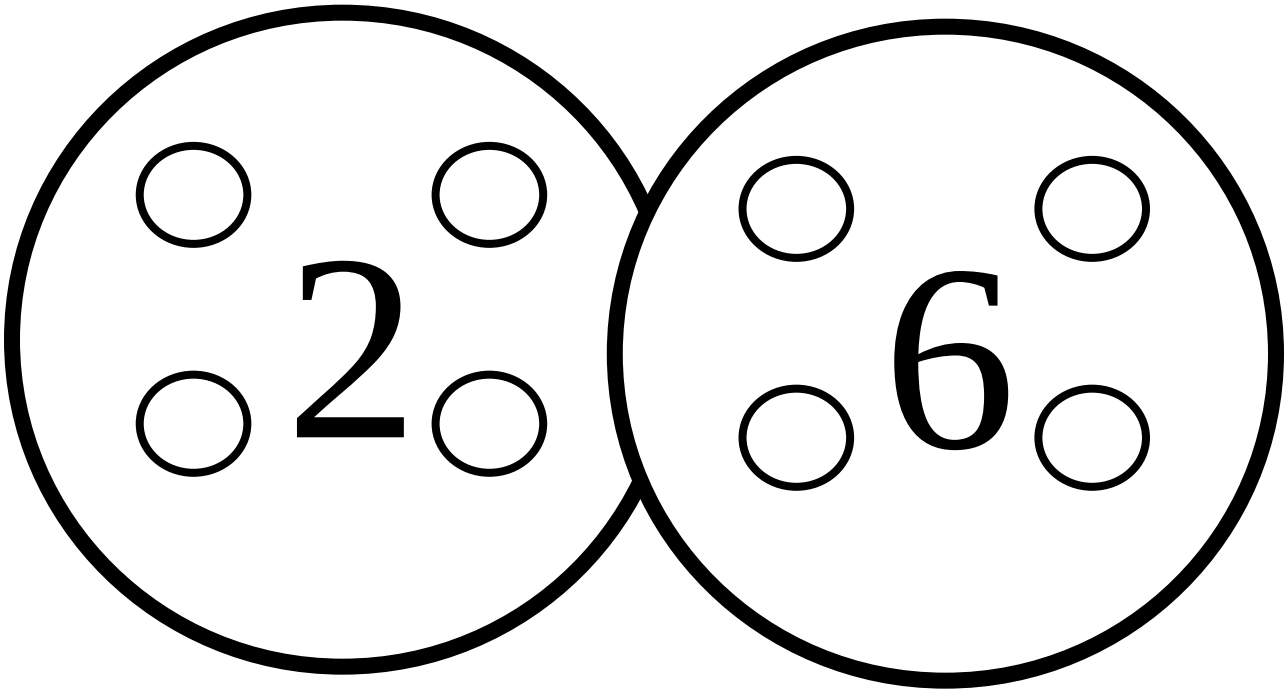
Article of Clothing	Number of Buttons
	
	
	
	
	
OTHER	
Total	

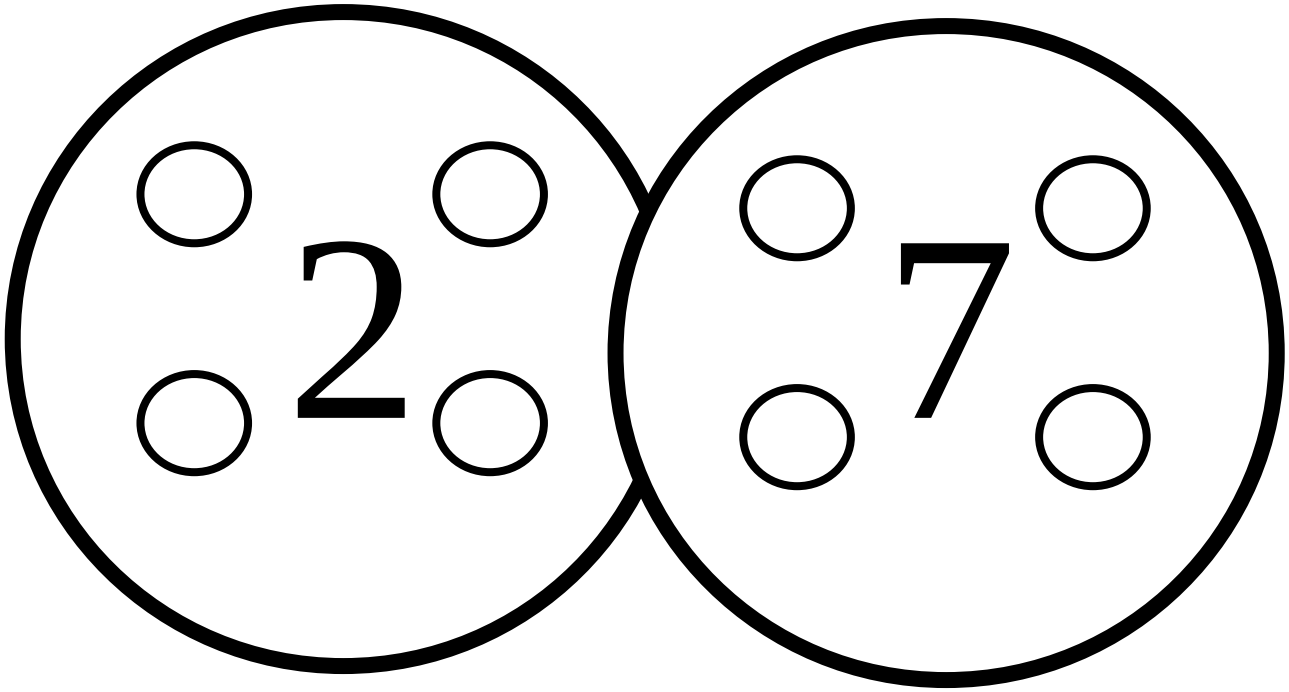
BUTTON NUMBERS

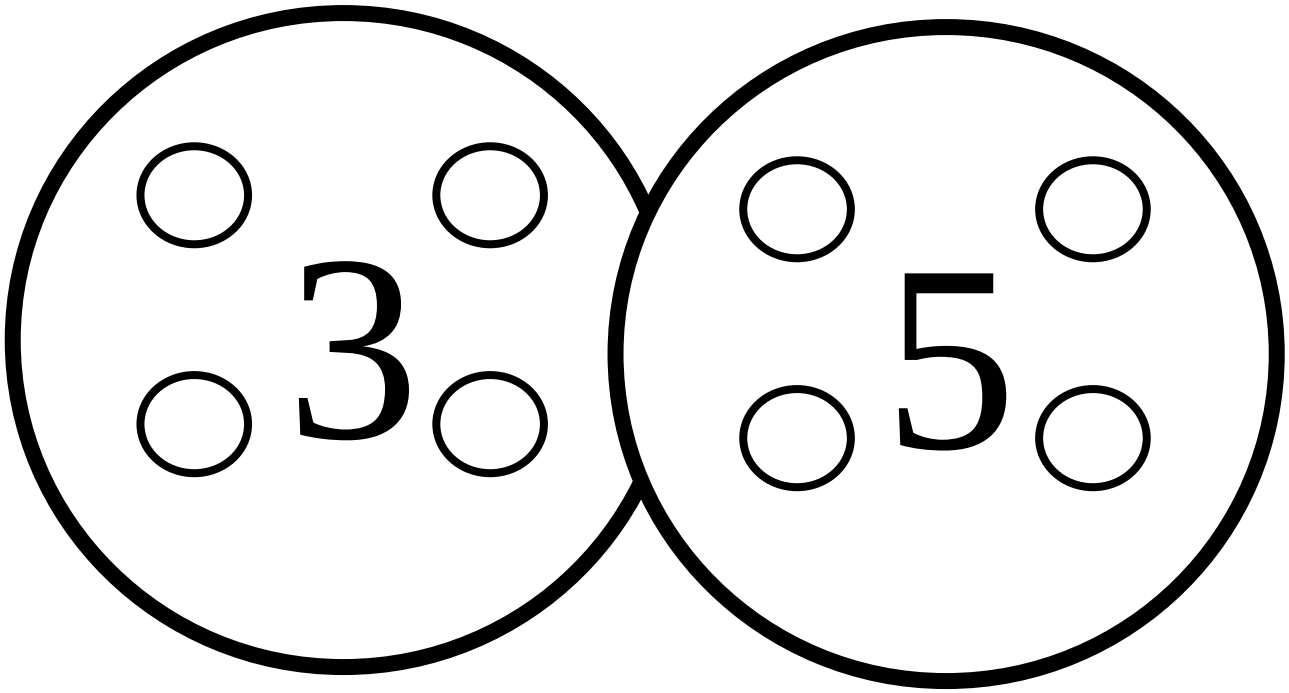


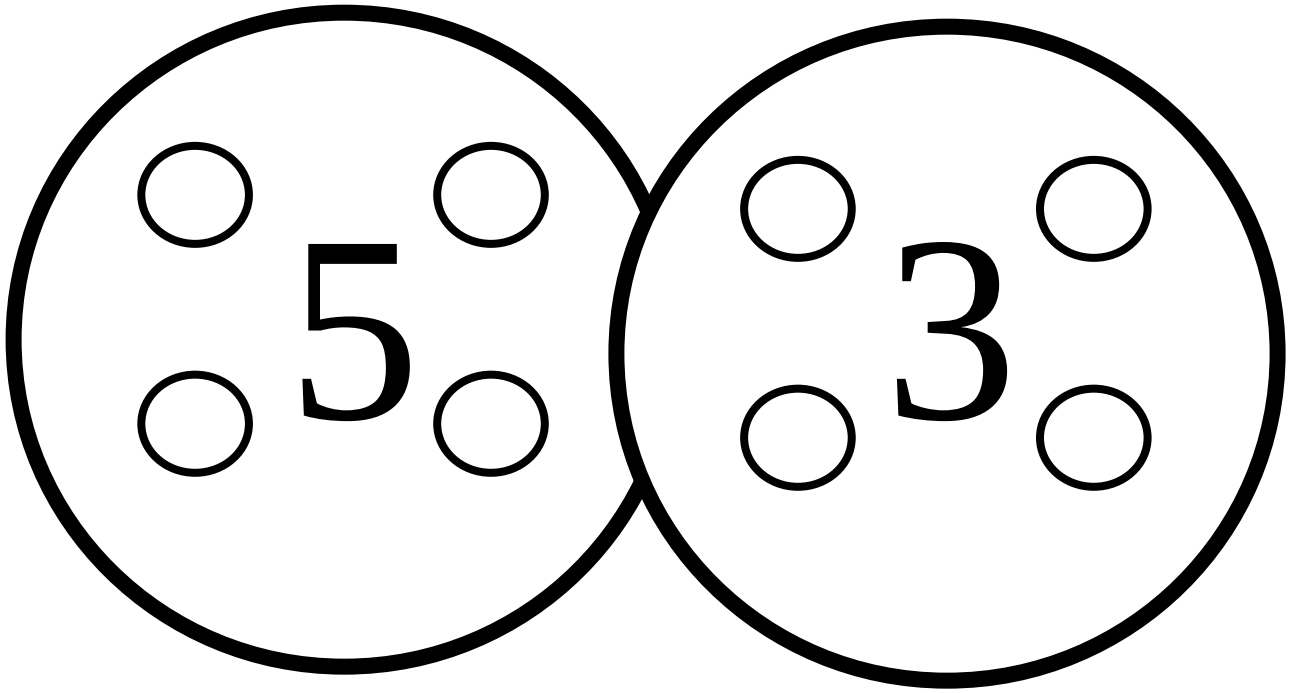


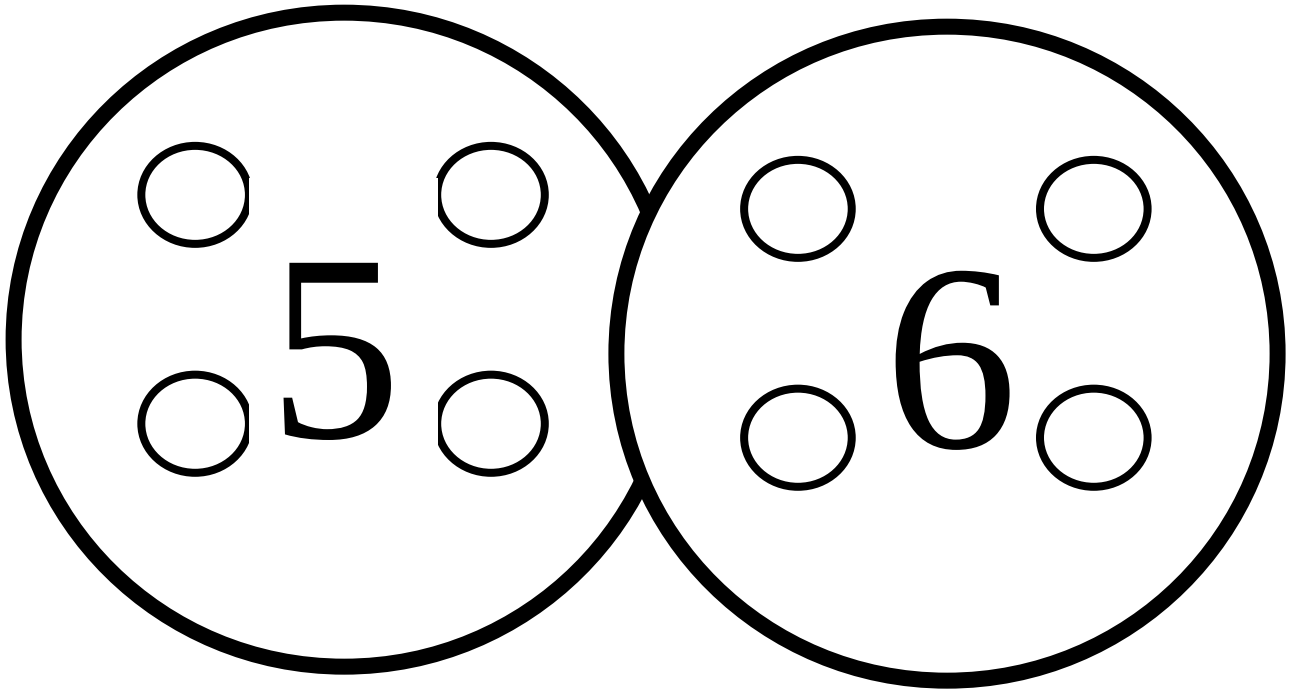

1
1

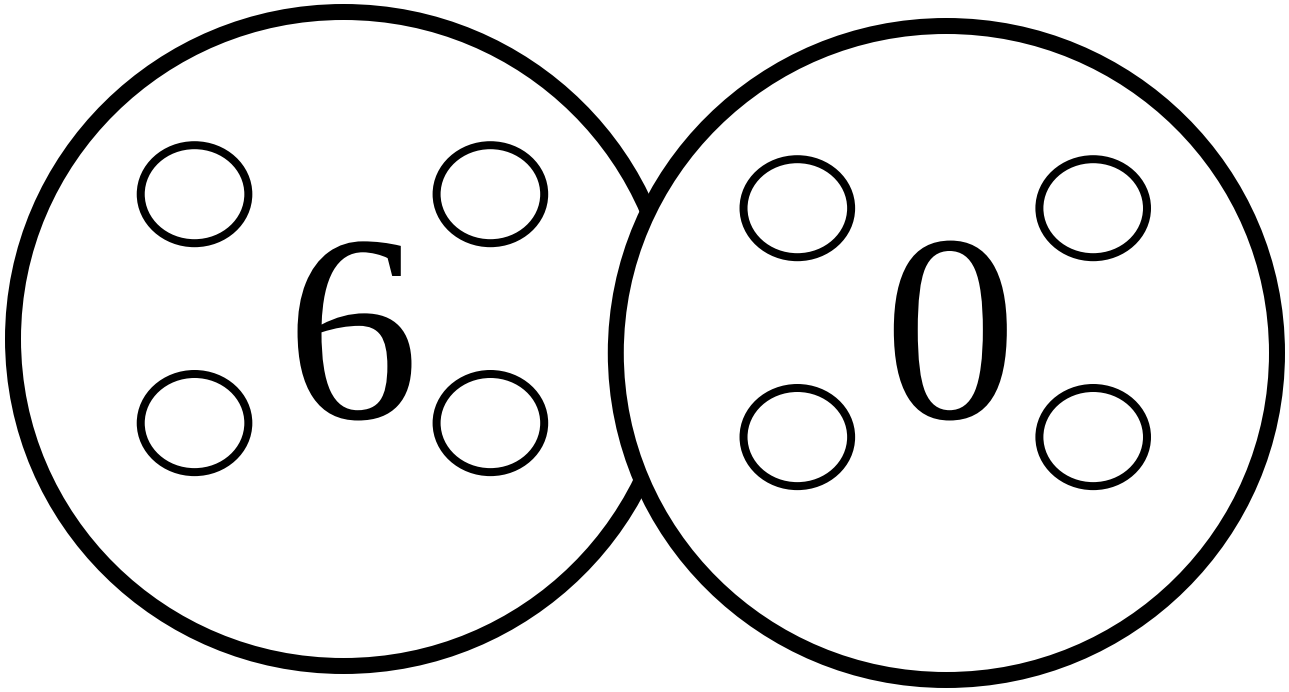

2
6

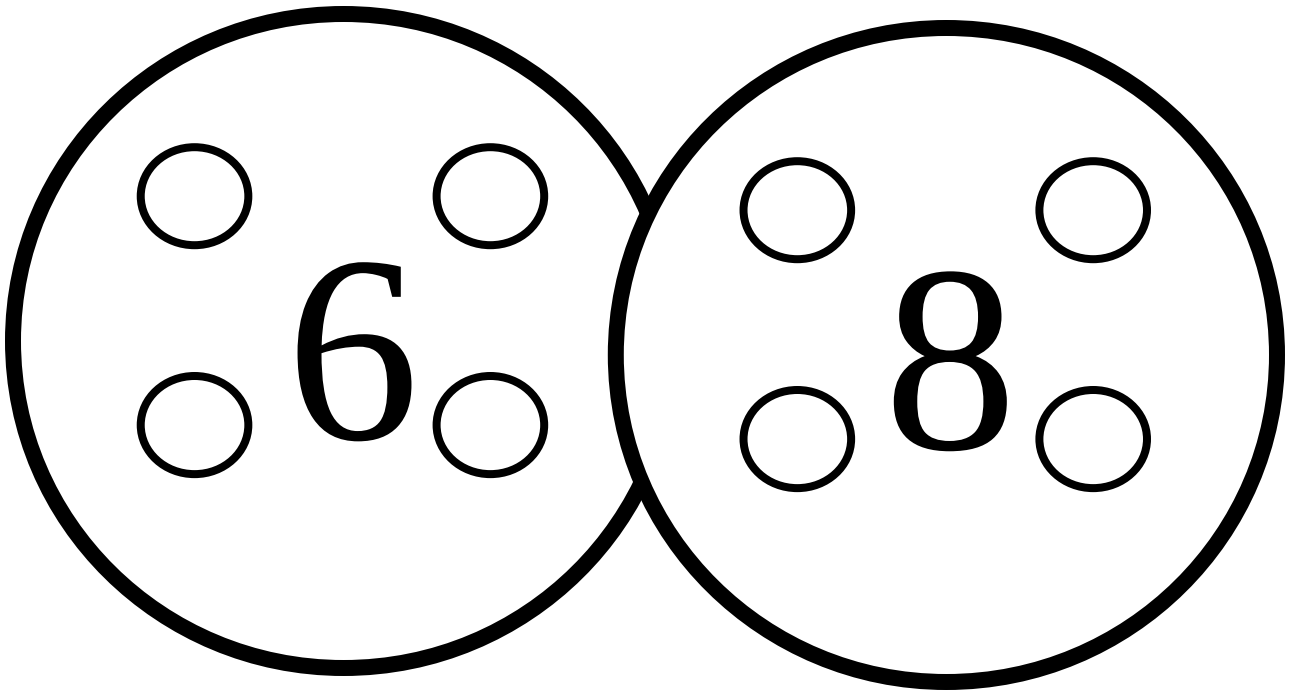

2
7

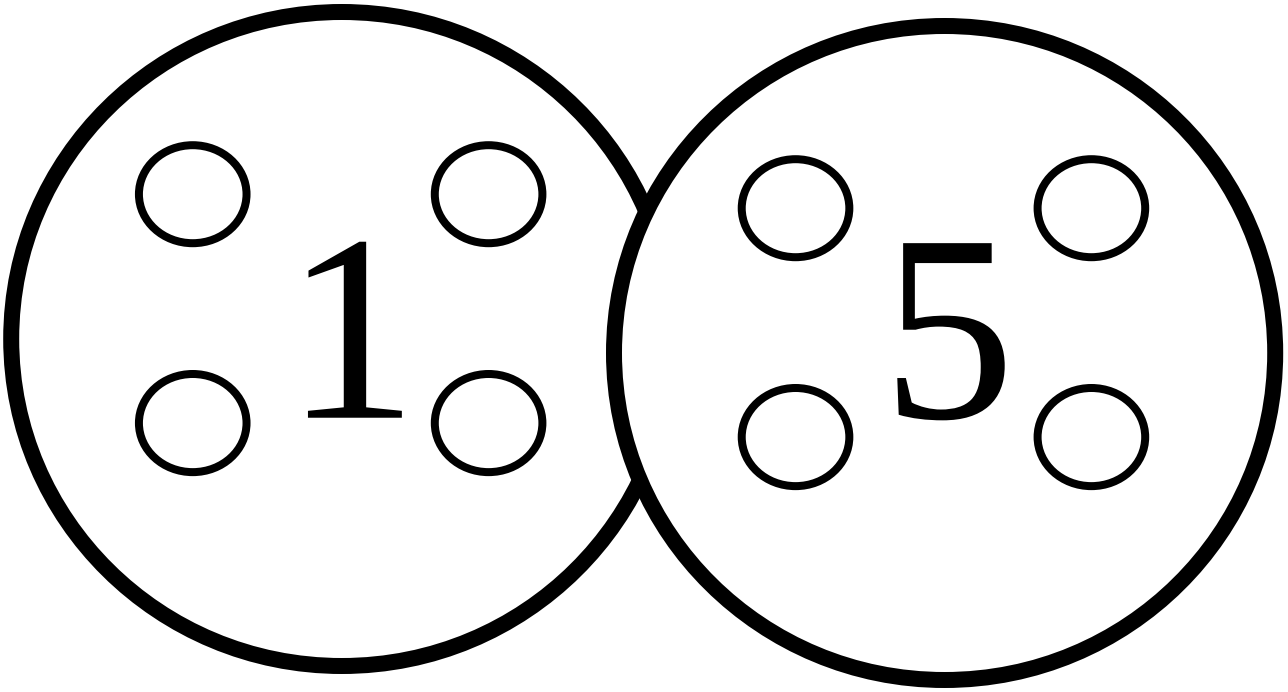

3
5

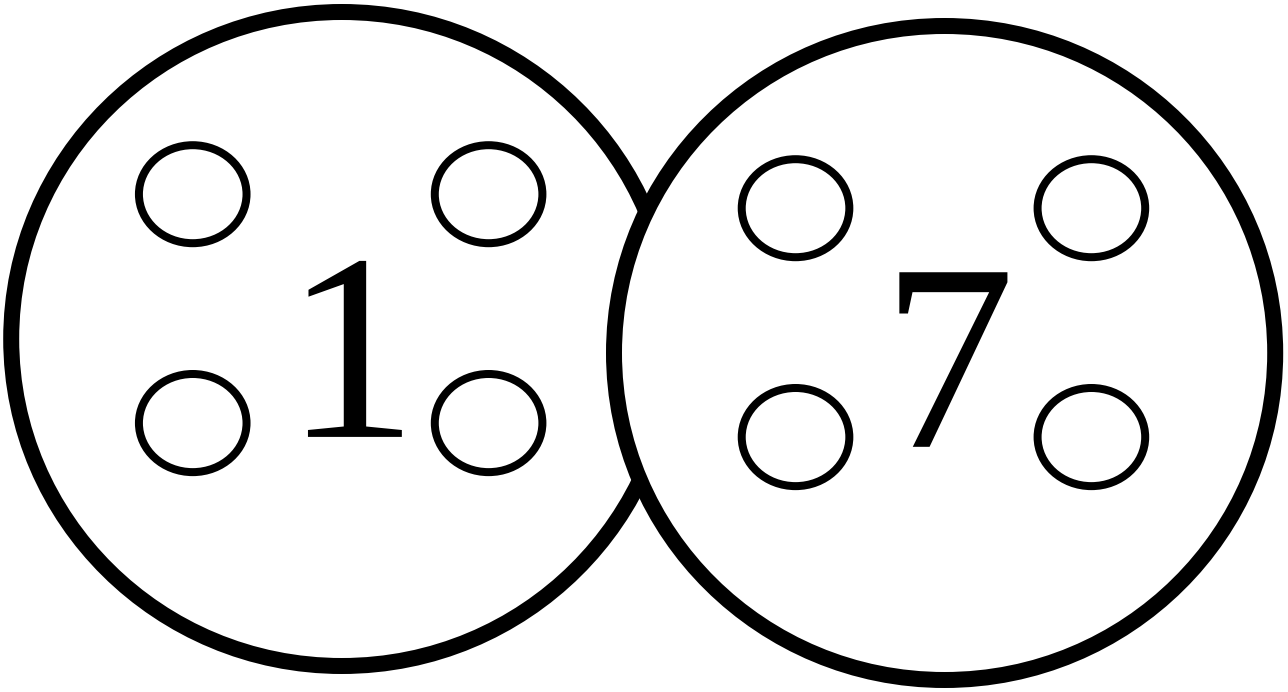

5
3

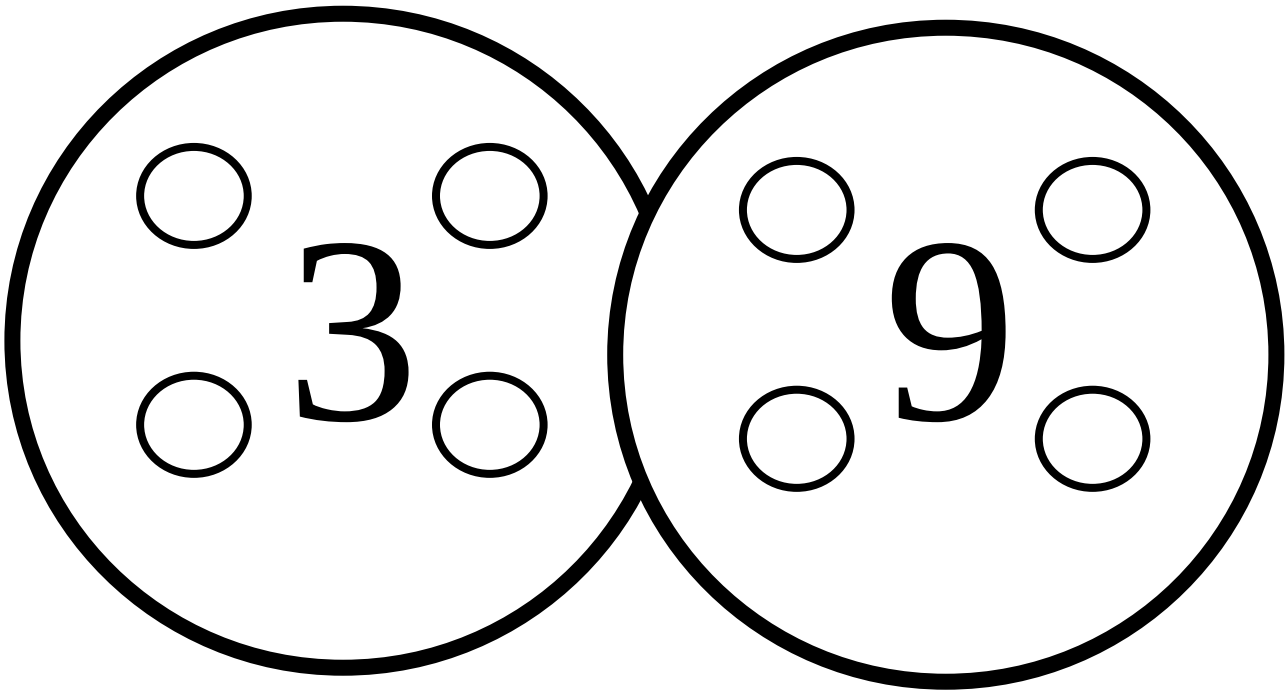

5
6

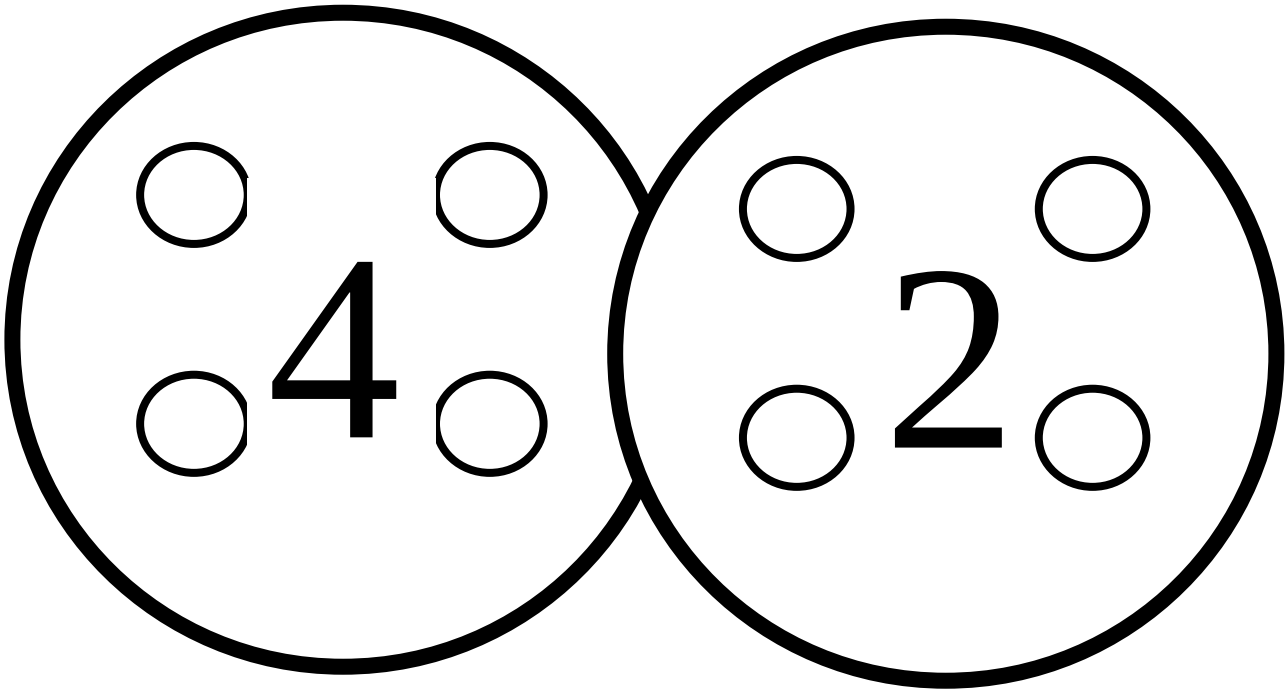

6
0

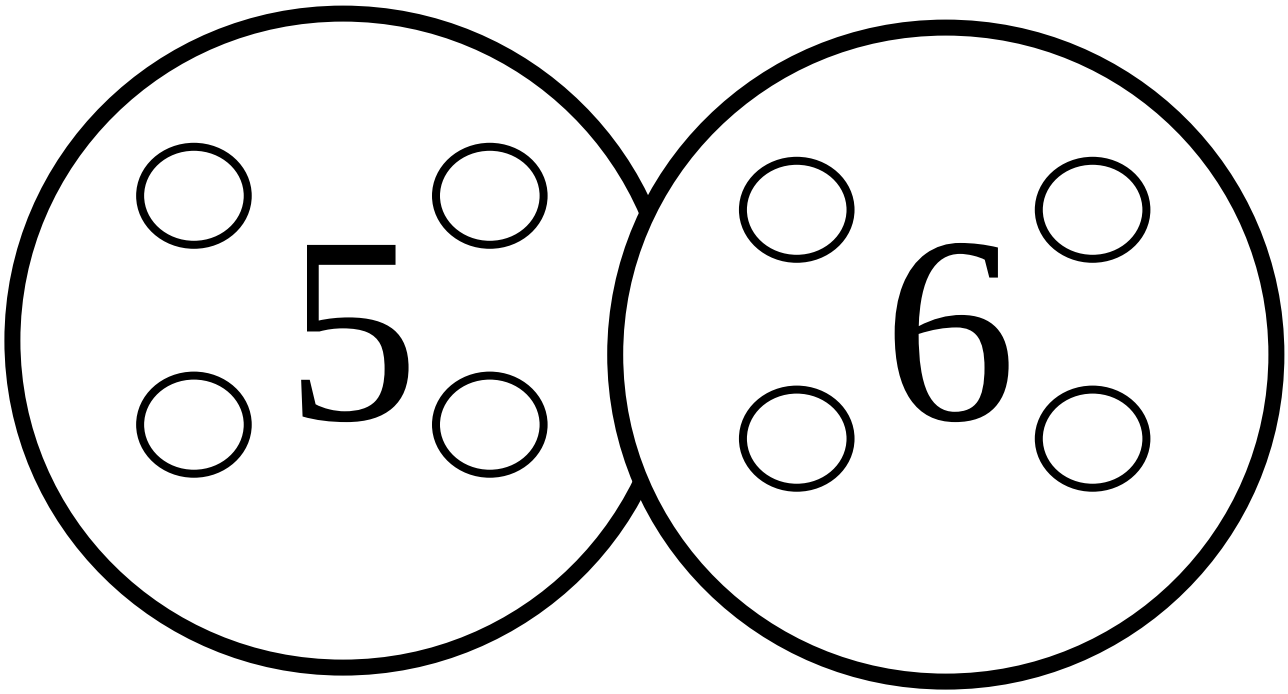

6
8

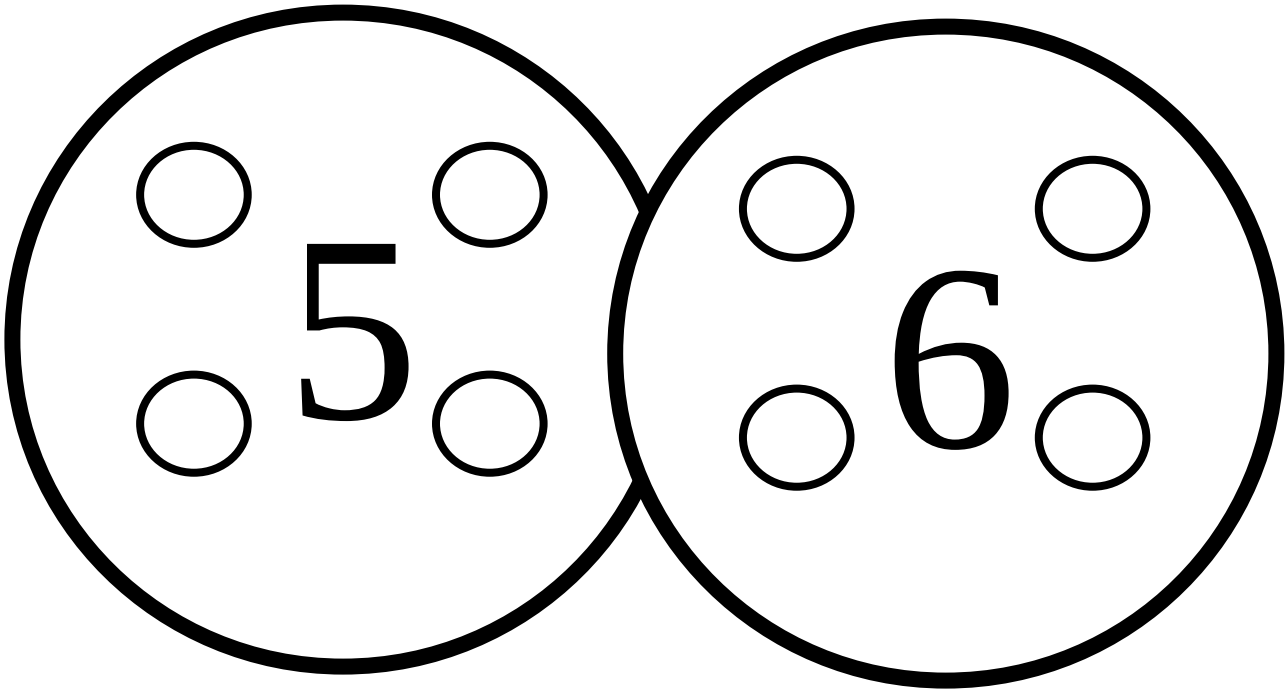

1
5

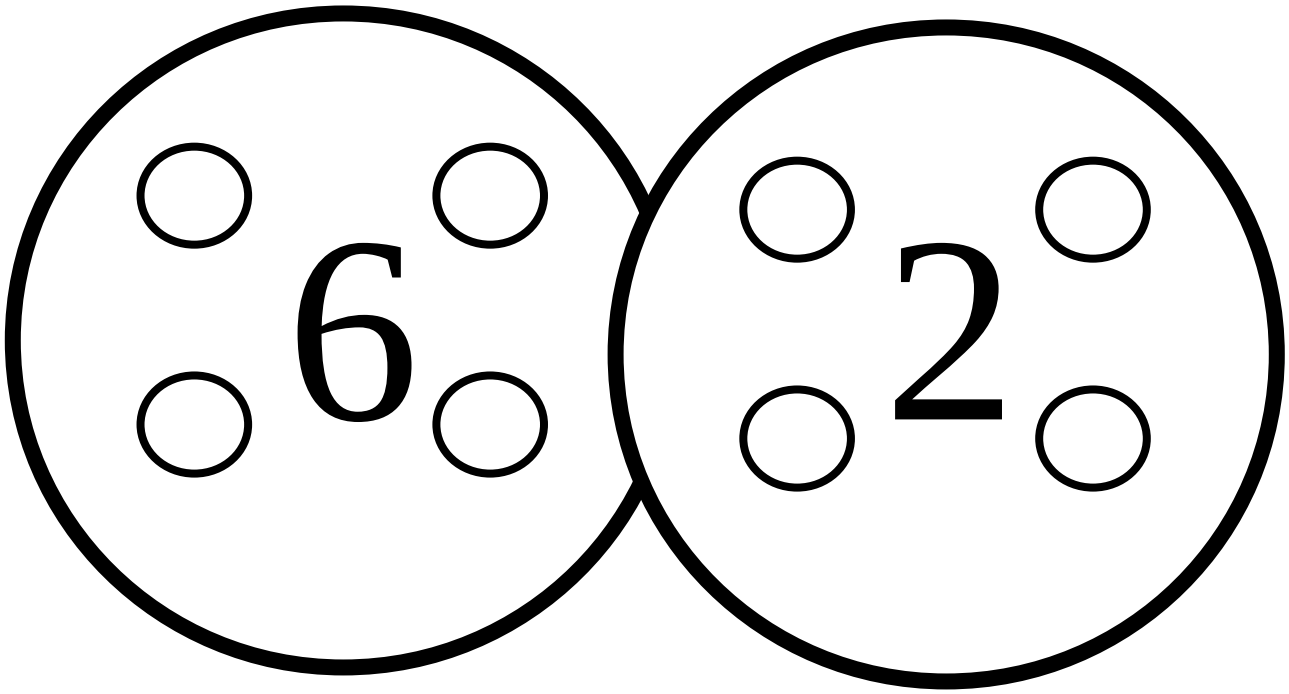

1
7

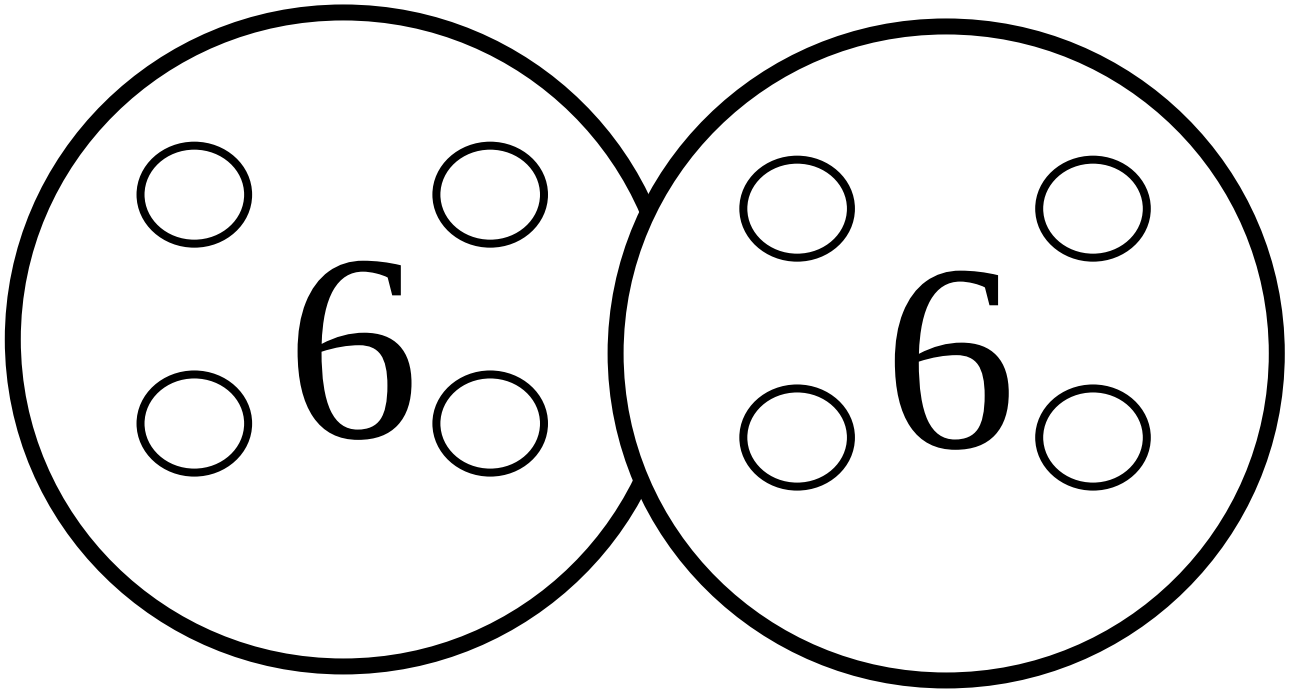

3
9


4
2

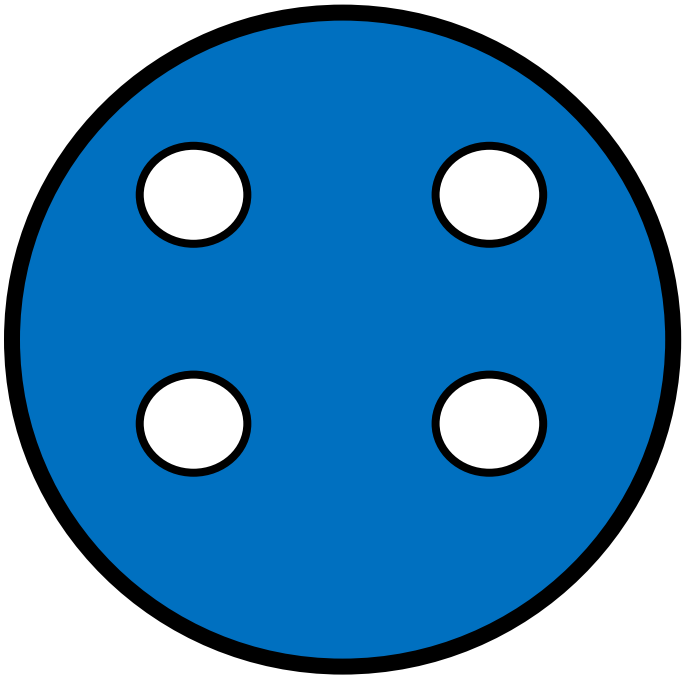

5
6

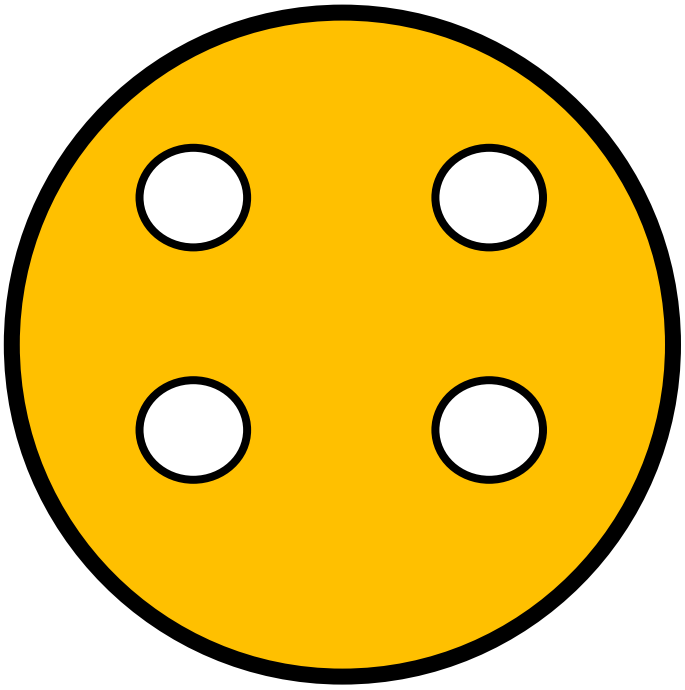

5
6


6
2


6
6

BOUNCING BUTTONS





Name_____Date_____

Students read the poem, "Grandma and her Button Jar" below and recorded the number of words they read in one minute.

GRANDMA AND HER BUTTON JAR

by Gloria Healy

The tallest jar I'd ever seen
Sat near a window of Gran's sewing room.
Filled with buttons from old family clothes…
Brass buttons, glass buttons, lace buttons;
Buttons guised as roses, apples and angels.

Gran would often put buttons in tiny
Tin cans with palm trees on their sides.
Holding them above her head, she'd spin around
The kitchen, shaking the cans like Spanish castinets,
The best times she came when she'd select her
Favorite button and tell its story.

Tiny white lace ones from the sleeve of her
Wedding gown reminded her of the secret ceremony…
Secret because she was Irish Catholic;
Her bridegroom, English Protestant.
In the old country they were forbidden to marry.

When she held the tiny brass button from
Grandpop's blue striped overalls, she recalled
Riding the famous Blue Comet while Grandpa
engineered it up and down the Jersey tracks.

Tears welled when she touched
The white linen button from her sister Kate's
First communion dress, made from the family's
Sunday dinner tablecloth.

Gran was quiet when she clutched the army button
From her young brother Tom's world War I uniform.
He didn't come home.

When Gran turned 75 she could still remember
Stories about her beautiful buttons but
Often forgotten her name, where she lived,
when she was born or who was president.
Momma said Gram was mental so she admitted her
to the state hospital….a place neighbors whispered about,
fearing it would someday be their fate too.

I went to visit her, found her tied to a rocking chair
singing hymns about Blessed Virgin Mary…
She grabbed my hand pleading for her button jar
After searching her sewing room, the attic, the cellar,
I asked momma if she knew where it was.

Momma answered,
I got rid of it.
Sold it for pennies I should have thrown it away.
That old thing wasn't worth anything.

The number of words each student recorded per minute:
80, 76, 65, 88, 91, 72, 88, 88, 63, 74, 82, 95, 70, 48, 99, 61, 77, 75, 66, 64, 71, 73, 88, 60

Create a stem and leaf plot in order to analyze the data. In your written analysis, be sure to include the number of words read by a typical student, any gaps in the data, and how the data could possibly change.

Name_____Date_____

Students read the poem, "Grandma and her Button Jar" below and recorded the number of words they read in one minute.

GRANDMA AND HER BUTTON JAR

by Gloria Healy

The tallest jar I'd ever seen
Sat near a window of Gran's sewing room.
Filled with buttons from old family clothes…
Brass buttons, glass buttons, lace buttons;
Buttons guised as roses, apples and angels.

Gran would often put buttons in tiny
Tin cans with palm trees on their sides.
Holding them above her head, she'd spin around
The kitchen, shaking the cans like Spanish castinets,
The best times she came when she'd select her
Favorite button and tell its story.

Tiny white lace ones from the sleeve of her
Wedding gown reminded her of the secret ceremony…
Secret because she was Irish Catholic;
Her bridegroom, English Protestant.
In the old country they were forbidden to marry.

When she held the tiny brass button from
Grandpop's blue striped overalls, she recalled
Riding the famous Blue Comet while Grandpa
engineered it up and down the Jersey tracks.

Tears welled when she touched
The white linen button from her sister Kate's
First communion dress, made from the family's
Sunday dinner tablecloth.

Gran was quiet when she clutched the army button
From her young brother Tom's world War I uniform.
He didn't come home.

When Gran turned 75 she could still remember
Stories about her beautiful buttons but
Often forgotten her name, where she lived,
when she was born or who was president.
Momma said Gram was mental so she admitted her
to the state hospital….a place neighbors whispered about,
fearing it would someday be their fate too.

I went to visit her, found her tied to a rocking chair
singing hymns about Blessed Virgin Mary…
She grabbed my hand pleading for her button jar
After searching her sewing room, the attic, the cellar,
I asked momma if she knew where it was.

Momma answered,
I got rid of it.
Sold it for pennies I should have thrown it away.
That old thing wasn't worth anything.

The number of words each student recorded per minute:
80, 76, 65, 88, 91, 72, 88, 88, 63, 74, 82, 95, 70, 48, 99, 61, 77, 75, 66, 64, 71, 73, 88, 60, 77

Create a stem and leaf plot in order to analyze the data. In your written analysis, be sure to include the number of words read by a typical student, any gaps in the data, and how the data could possibly change.

	Number of Words Read in One Minute
4	8
5	
6	0 1 3 4 5 6
7	0 1 2 3 4 5 6 7 7
8	0 2 8 8 8 8
9	1 5 9

Key 4/8 = 48

Answers May Vary

Name_____Date_____

EXIT TICKET

Use the stem and leaf plot to analyze the Math test scores for each student in the class.

Test Scores

5	3 5
6	0 7 7 8 9 9
7	0 1 2 8 8 8 9
8	3 4 5 5 5 5 6
9	2 7

Key 5/3 = 53

1. What is the highest and lowest test score?_____
2. What is the median test score?_____
3. How many students had a score in the 70's?_____
4. If three students were absent and made up the test and received a 59, 99, and 95 then is there a new median? Explain why. _____

_____

_____

Name_____Date_____

EXIT TICKET

Use the stem and leaf plot to analyze the Math test scores for each student in the class.

Test Scores

5	3 5
6	0 7 7 8 9 9
7	0 1 2 8 8 8 9
8	3 4 5 5 5 5 6
9	2 7

5. What is the highest and lowest test score? Highest 97 and lowest 53

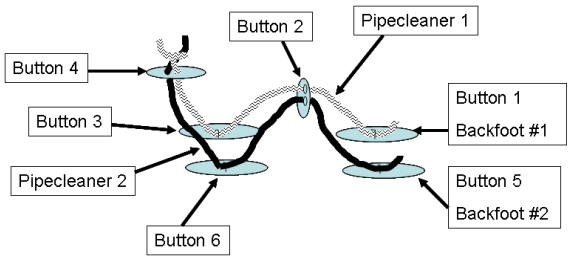
6. What is the median test score? 78

7. How many students had a score in the 70's? 7

8. If three students were absent and made up the test and received a 59, 99, and 95 then is there a new median? Explain why. This does not change the median because even with the new test scores added, when you "button bounce" back you still land on 78 (key point: because 78 is also the mode and the mode is located in the middle of the data).

Name_____Date_____

Button Bugs



Materials:

Assorted Buttons
Pipe Cleaners
Pencil
Timer

Instructions:

1. Each pair of students will need to gather 2 pipe cleaners and 3 pairs of buttons.
2. Thread the first pipe cleaner through the first button, then slightly bend the pipe cleaner. This is back bug foot #1.
3. Put the second button on the pipe cleaner then bend the pipe cleaner to create the body (Keep the button holes the same).
4. Bend the pipe cleaner again to create front foot #1.
5. Place the third button on the bend of the pipe cleaner.
6. The fourth button should match the second button. This creates the button bug head.
7. Get the matching button to the first button and put the second pipe cleaner through the buttonhole. Then slightly bend the pipe cleaner to create back bug foot #2.
8. Thread pipe cleaner number two through the second hole (Hole B) of the body button and then bend the pipe cleaner.
9. Place the final button on the pipe cleaner creating front foot #2.
10. Thread the end of the pipe cleaner through second hole of the head button and twist it with the end of the first pipe cleaner. This creates an antennae.

Congratulations! You have created a BUTTON BUG!

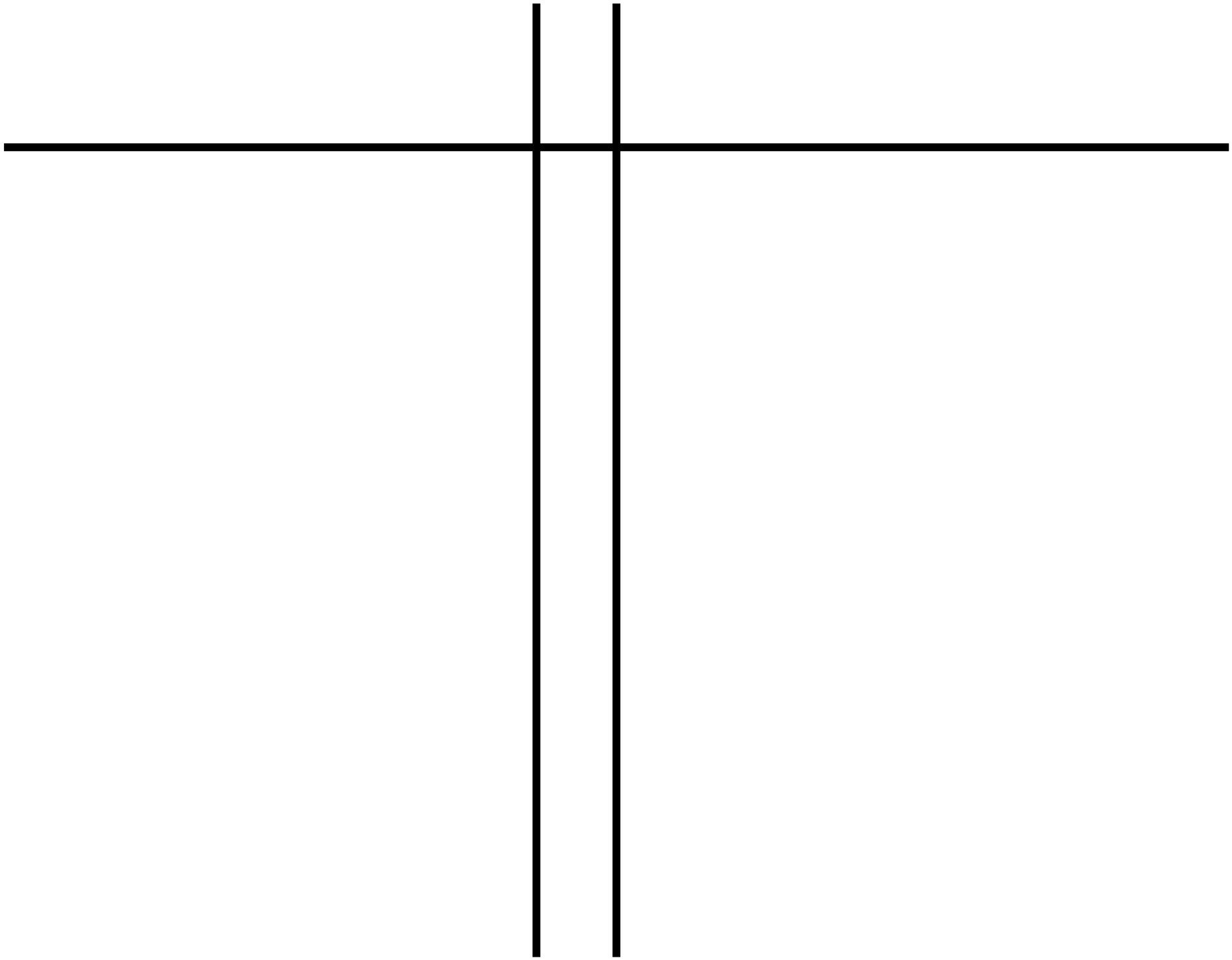
Name: _____ Date: _____

Button Bugs Boutique

Test your skills in order to get hired at the Button Bug Boutique. Follow the directions to get your bug made and then challenge yourself to get a faster time.

Name	Times

Class Data



Name: _____ Date: _____

Button Bugs Boutique

The Button Boutique has agreed to hire a team of engineers to work together as long as they can prove their efficiency. Work together with your team to create a plan that will allow you to create a single bug in a faster time than on your own.

Trial	Times

Name: _____ Date: _____

Use the scores from the 2010 football season to create a back to back stem and leaf plot so that the scores can be compared.

Washington Redskins

27	16	17	16
24	17	25	59
19	13	7	16
30	20	14	42
3	16	10	13

Baltimore Ravens

10	10	24	17
31	20	37	26
21	37	17	10
34	30	20	13
30	24	17	23

Step B

Which team should your classmates cheer for in the coming season? Explain why you know your answer is correct. Use what you know about in your explanation. Use words, numbers, and/or symbols in your explanation.

Name: _____ Date: _____

Use the scores from the 2010 football season to create a back to back stem and leaf plot so that the scores can be compared.

Washington Redskins

27	16	17	16
24	17	25	59
19	13	7	16
30	20	14	42
3	16	10	13

Baltimore Ravens

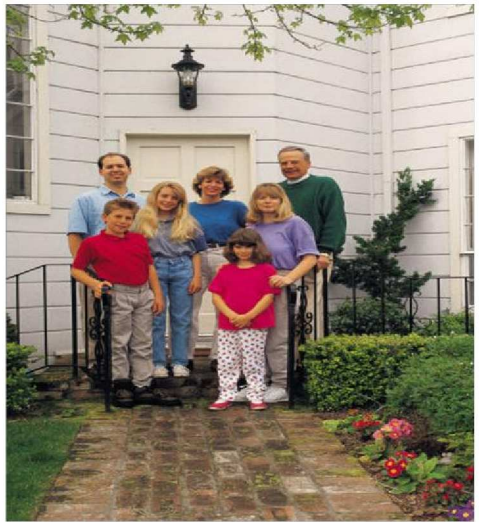
10	10	24	17
31	20	37	26
21	37	17	10
34	30	20	13
30	24	17	23

Washington Redskins scores for 2010		Baltimore Ravens scores for 2010
7 3	0	
9 7 7 6 6 6 6 4 3 3 0	1	0 0 0 3 7 7 7
7 5 4 0	2	0 0 1 3 4 4 6
0	3	0 0 1 4 7 7
2	4	
9	5	

Step B

Which team should your classmates cheer for in the coming season? Explain why you know your answer is correct. Use what you know about in your explanation. Use words, numbers, and/or symbols in your explanation.

Answers will vary –
Check vocabulary and explanation for understanding of comparison

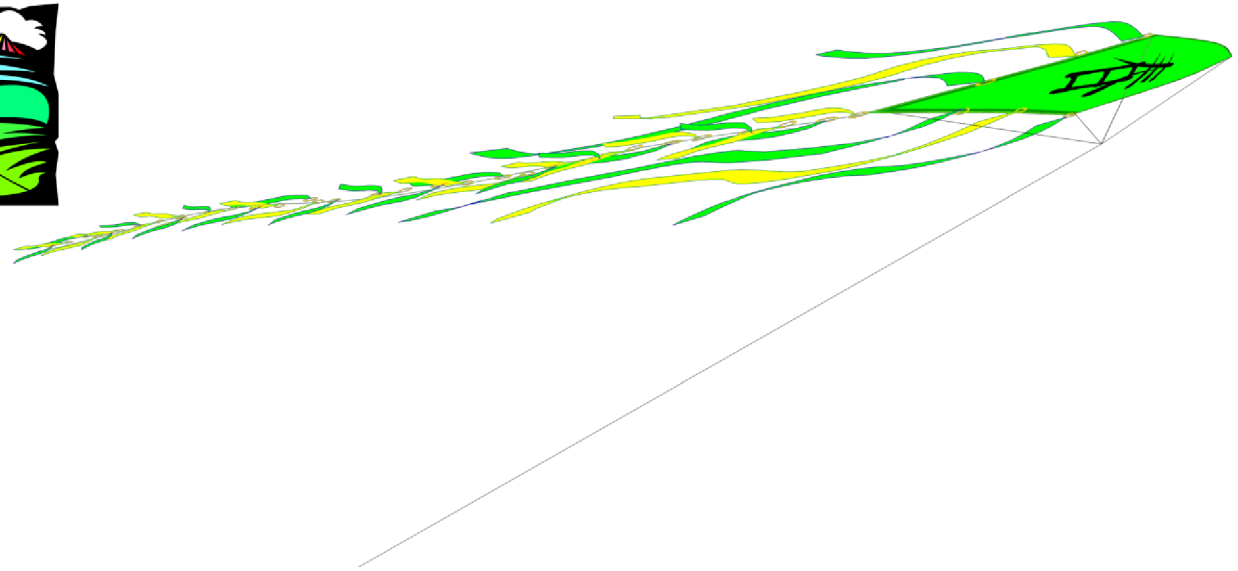


600,000 Families

How many families can use the electricity from a single wind farm?

2 ½ Miles

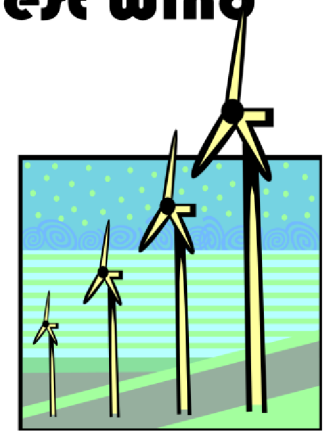
How high has a kite ever flown?



The length of a football field

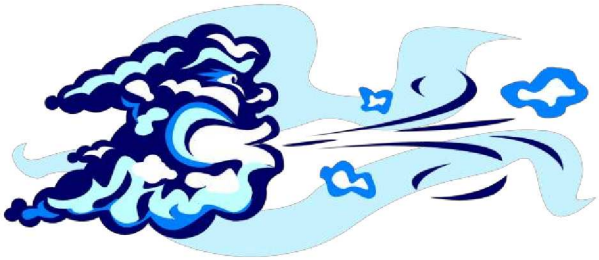
How large are the blades of the largest wind turbine?

located in Hawaii

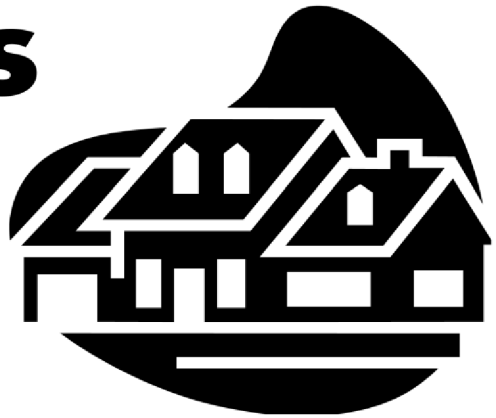


Port Martin, Antarctica

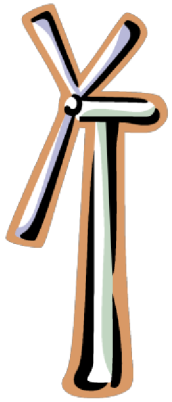
Where are there gale force winds of 40 miles more than 100 days a year?

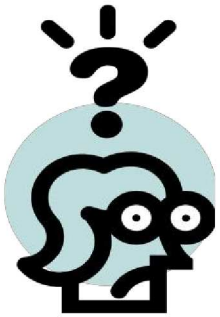


300 Homes



How many home can a single wind turbine produce electricity for?

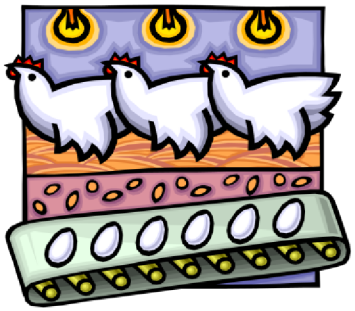




Zephyr

What is the synonym for a light wind?

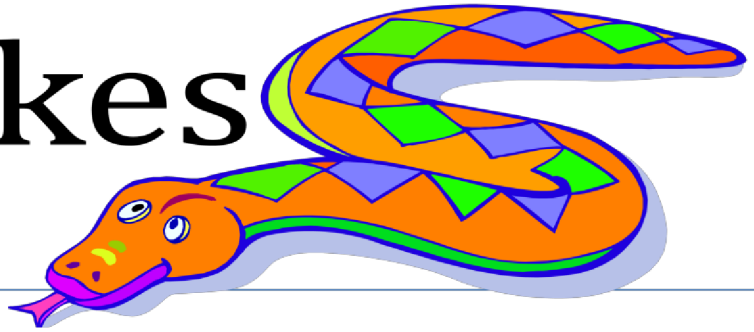
256 square feet Chicken House



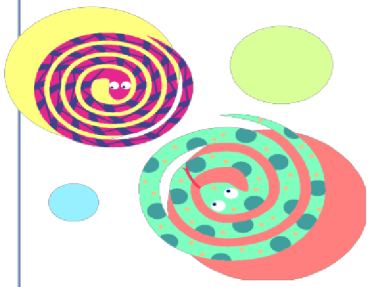
What was the largest object ever carried by a tornado?

All eggs and birds were unharmed.

Snakes



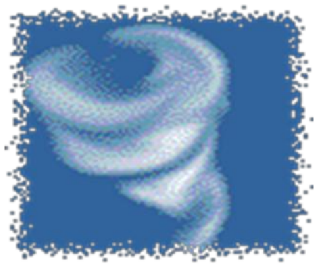
What animal has been seen flying in the wind?



286 miles per hour

What is the fastest tornado wind ever documented?

(Whicita Falls, Texas 4/2/58)



Name: _____ Date: _____

Button Blower

Place the button on the starting line and give a mighty blow. Use a centimeter ruler to measure how far the button traveled in the wind that you created. Each person in your team needs to try it 5 times.

Name	**1st try**	**2nd try**	**3rd try**	**4th try**	**5th try**

Create a stem and leaf plot to organize the class data.

Amount of Flowers in each Yard

Daffodils		Dandelions
9 9 8 6 3 1 1 0	2	0 1 5 7
4 2 0 0	3	1
6 3	4	2 2 8 8 8 8 9
	5	0 0 1 2 2 7 9

The number of cars parked in the school lot each day for a month

0	2 2 2 2 6
1	0 0 3 4 6 7 7 8 9
2	0 0 1 1 1 1 3 4 5 5 6 6 6
3	0 0 1
4	
5	

Number of students at parties all year

1	0 0 0 0 1 1 1 1 2 2 3
2	1 1 1 2 3 4 5 5 5 5 6
3	3 3 3 9
4	0 0 2 5 8

Score of the Baseball Games for the 2011 Tigers

4	2 6 8 8 9
5	0 0 1 4
6	1 1 4 6 6 8 8 8 9
7	0 0 1 2 2 2
8	0 1 2 4 4 4 4 6

How many times does your heart beat in 60 seconds

4	2 5 8 8 9
5	0 0 1 3
6	1 1 4 7 7 8 9 9 9
7	0 0 1 1 1 2

The number of students in each class

1	6 8 8 8 9
2	0 2 2 5 5 5 5 6 7
3	0 0 0 1 2

Name_____Date_____

Pinwheel Extension Activity

Materials:

Pinwheel Pattern
Unsharpened Pencil w/new eraser
Pushpin
Graph paper
Construction Paper
Scissors

1. Cut pinwheel pattern out on the solid lines only.
2. Glue onto the construction paper and cut the construction paper so that it is even with the pinwheel.
3. Color one triangle red.
4. Cut the dotted lines from the four corners to the center circle (Try not to cut into the center circle).
5. Use the push pin to poke four holes through the four tiny dark circles.
6. Make the tiny poked holes on the four points meet at the center circle.
7. Push the pushpin through the holes on the pinwheel and then through the center circle. Attach it to the eraser at the end of the new pencil.
8. Take a deep breath and make your wind turbine work to operate your pinwheel.
9. Begin collecting data. Count the number of spins (the number of times the red blade goes by) per blow. HAVE FUN!!

Name_____Date_____

Data Sheet

Record the number of spins per blow in the chart below:

STUDENT #1

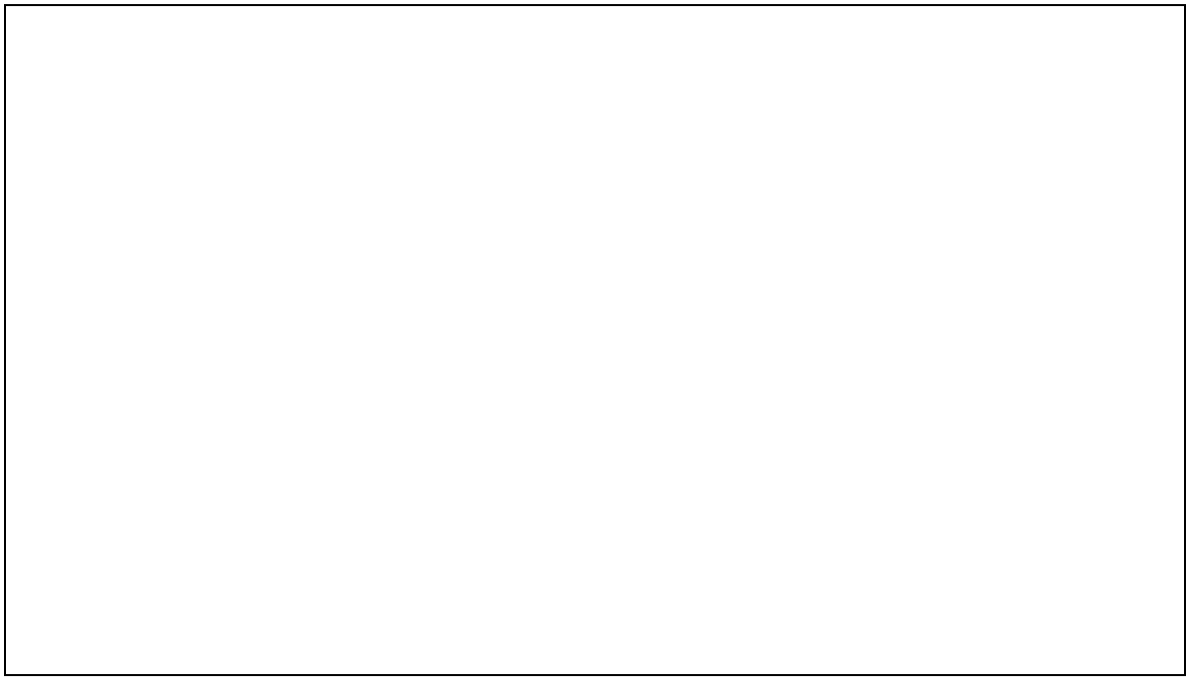
Number of Blows	Number of Spins

STUDENT#2

Number of Blows	Number of Spins

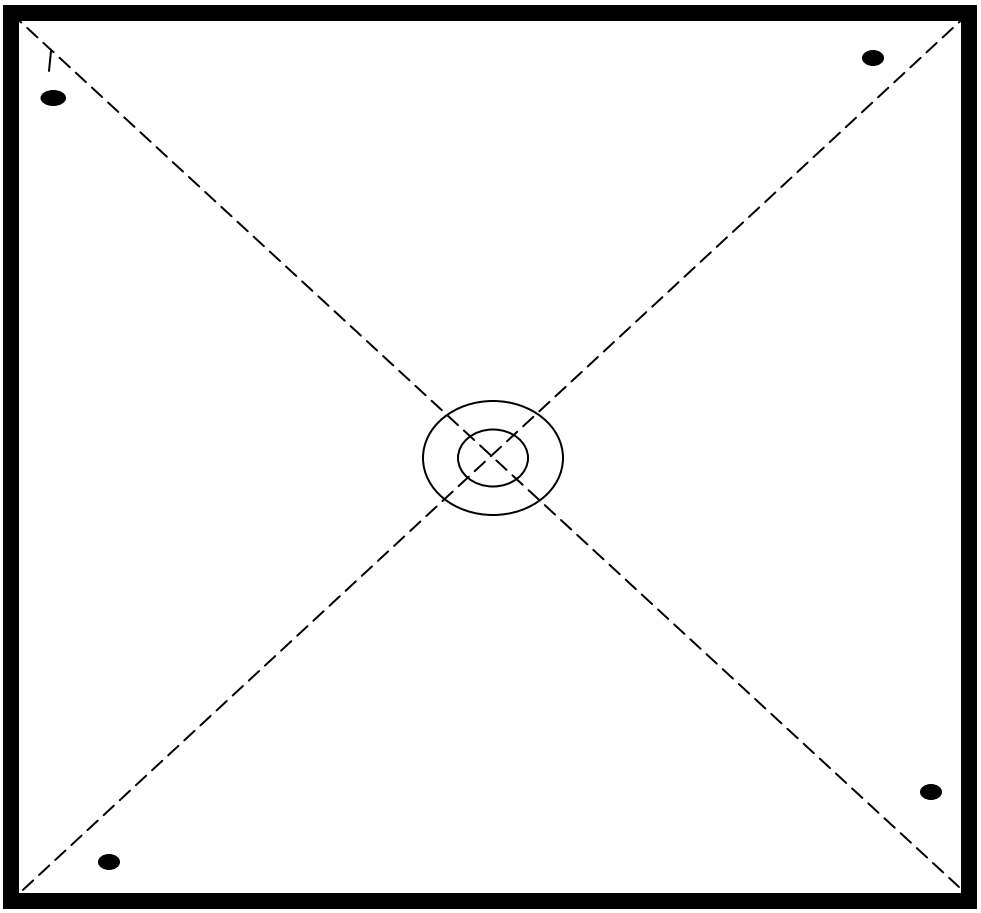
Data Sheet Part2

Use your data to create a back to back stem and leaf plot. Analyze your data in order to explain the median, mode, and gaps in the data. Which student had a more powerful wind turbine?



_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Pinwheel Pattern



Name_____Date_____

Factory Data:

The Button Bracelet Outlet and the Fancy Button Bags distributed data about the efficiency of their factories. Each factory recorded the number of custom products produced over a one month period.

Days	# of Button Bracelets
1	43
2	64
3	58
4	80
5	77
6	70
7	72
8	52
9	67
10	44
11	22
12	48
13	79
14	12
15	77
16	91
17	66
18	99
19	84
20	77
21	85
22	52
23	51
24	39
25	40
26	77
27	63
28	68
29	53
30	47
31	98

Days	# of Fancy Button Bags
1	12
2	24
3	46
4	34
5	41
6	10
7	47
8	51
9	68
10	20
11	43
12	50
13	67
14	34
15	30
16	25
17	68
18	35
19	66
20	27
21	68
22	53
23	11
24	41
25	21
26	33
27	16
28	34
29	15
30	54
31	

Name_____Date_____
_

Factory Analysis:

Using the data create a stem and leaf plot to display trends in production of each product. In your analysis include numbers and explanations to prove which factory is the most efficient.

Write a letter to the president of the factory explaining your analysis of the factory efficiency and offer suggestions to increase production.

Name_____Date_____

Summative Assessment
Wind Speed

Directions: Use the data from www.localweather.com on the wind speed recorded in 44 states on a given day to create a back to back stem and leaf plot.

Eastern States	Western states	Wind speed (miles per hour)	
Maryland	Alaska	26	44
Connecticut	Arizona	15	19
New Jersey	California	27	22
New York	Colorado	13	27
Delaware	Hawaii	18	29
Pennsylvania	Idaho	14	17
Massachusetts	Montana	19	22
New Hampshire	Nevada	23	13
Rhode Island	New Mexico	29	22
Vermont	Oregon	11	31
West Virginia	Utah	17	26
Virginia	Washington	20	20
Kentucky	Wyoming	12	30
Arkansas	Texas	14	13
Tennessee	Missouri	21	15
Mississippi	North Dakota	33	13
Alabama	South Dakota	22	14
Louisiana	Kansas	33	36
Georgia	Nebraska	33	33
Florida	Iowa	30	26
North Carolina	Michigan	31	36
South Carolina	Wisconsin	33	28

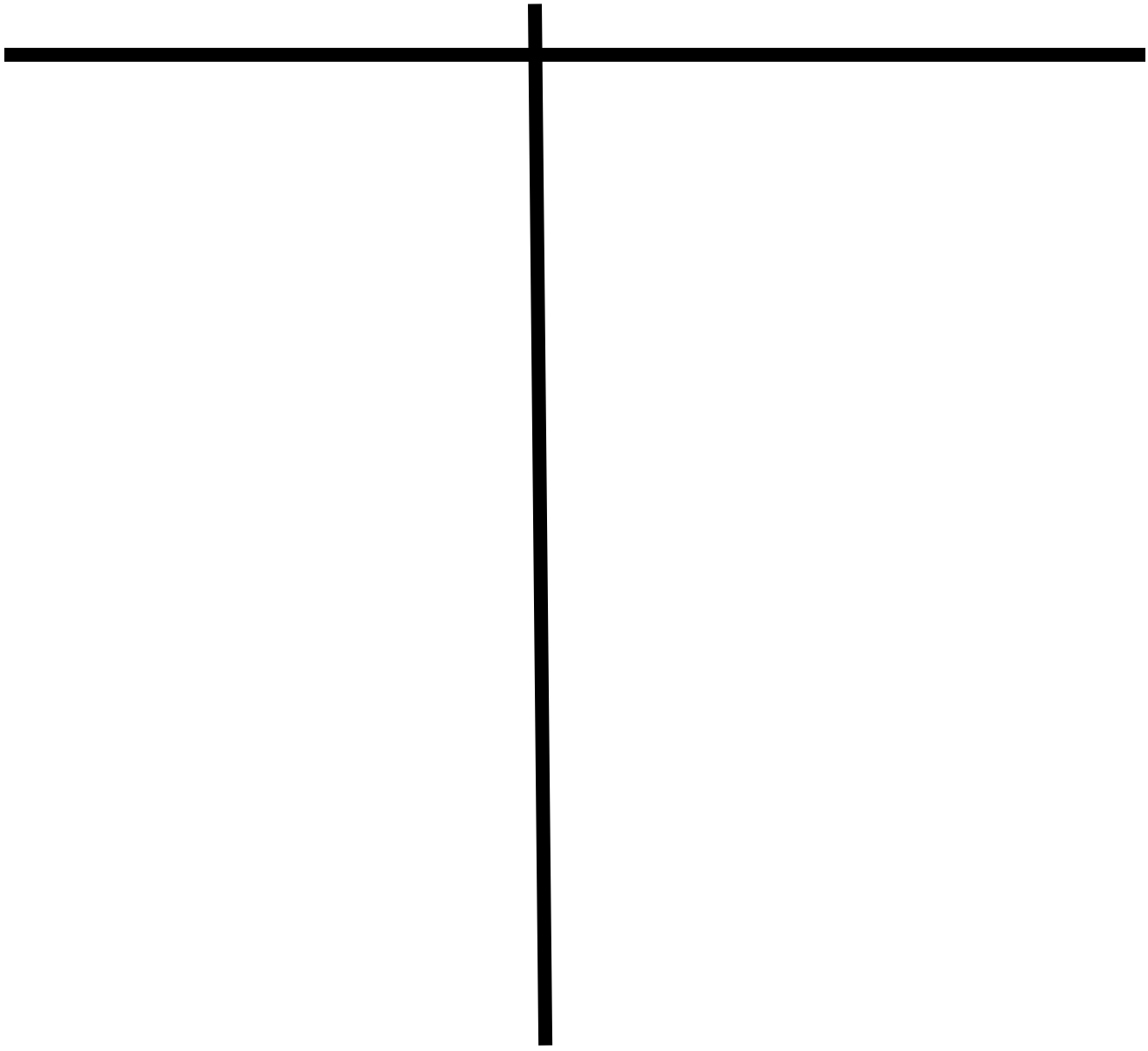
Name_____Date_____

Summative Assessment

Wind Speed

Stem and Leaf Plot

(Don't forget Tails!)



Name_____Date_____

Summative Assessment
Wind Speed
Analysis

What is a typical wind speed in the states represented? Use what you have learned about data analysis in your explanation._____

Name_____Date_____

Summative Assessment
Wind Speed

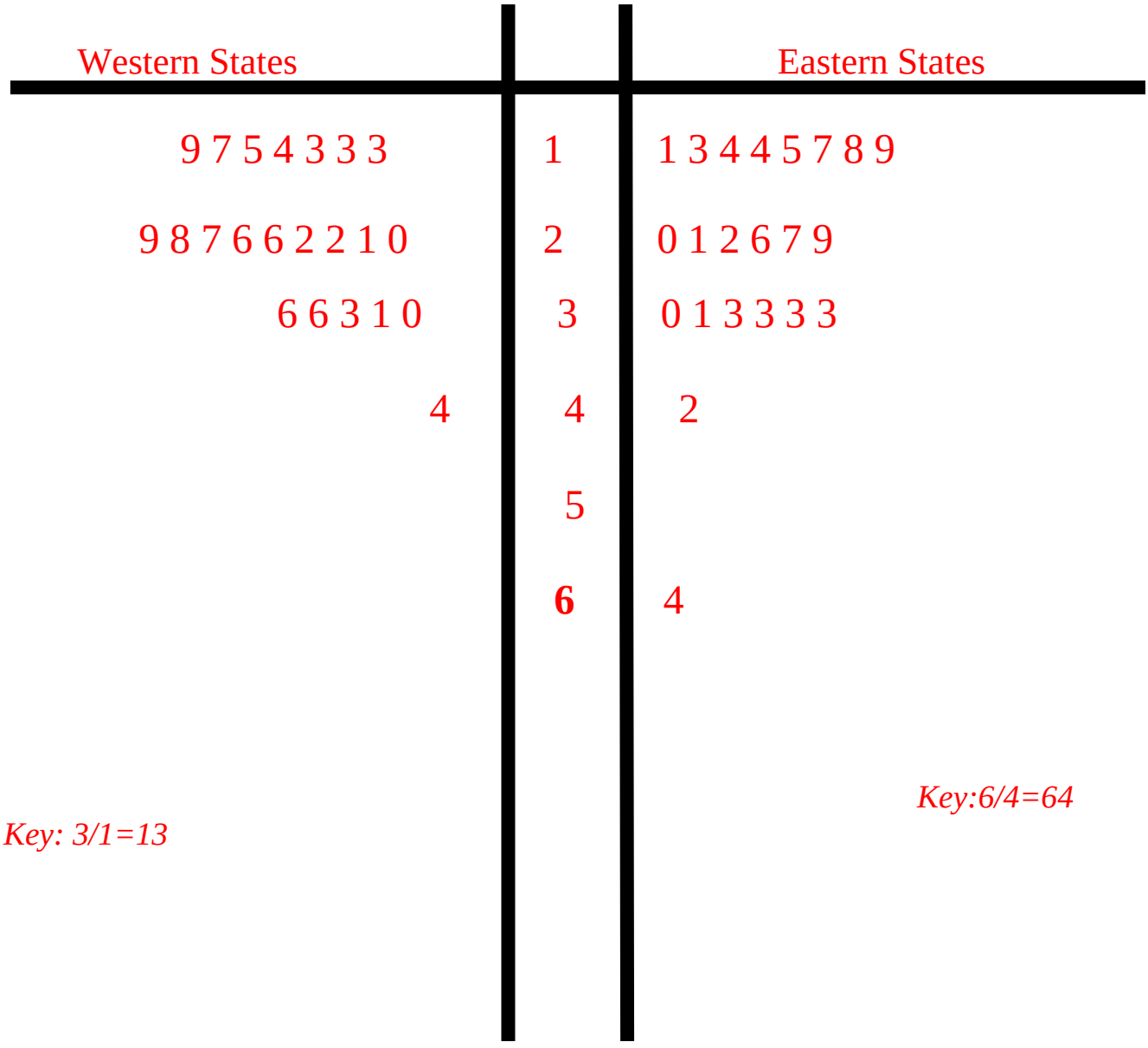
Directions: Use the data from www.localweather.com on the wind speed recorded in 44 states on a given day to create a back to back stem and leaf plot.

Eastern States	Western states	Wind speed (miles per hour)	
Maryland	Alaska	26	44
Connecticut	Arizona	15	19
New Jersey	California	27	22
New York	Colorado	13	27
Delaware	Hawaii	18	29
Pennsylvania	Idaho	14	17
Massachusetts	Montana	19	21
New Hampshire	Nevada	23	13
Rhode Island	New Mexico	29	22
Vermont	Oregon	11	31
West Virginia	Utah	17	26
Virginia	Washington	20	20
Kentucky	Wyoming	42	30
Arkansas	Texas	64	13
Tennessee	Missouri	21	15
Mississippi	North Dakota	33	13
Alabama	South Dakota	22	14
Louisiana	Kansas	33	36
Georgia	Nebraska	33	33
Florida	Iowa	30	26
North Carolina	Michigan	31	36
South Carolina	Wisconsin	33	28

TEACHER RESOURCE

Summative Assessment
Wind Speed
Stem and Leaf Plot

(Don't forget Tails!)



Key: 3/1=13

Key:6/4=64

Name_____Date_____

Summative Assessment
Wind Speed
Analysis
(Answers may vary)

Step A What is a typical wind speed in the states represented? Use what you have learned about data analysis in your explanation. The typical wind speed in the Western United States is 26 miles per hour and the mode is 26 miles per hour. The typical wind speed in the Eastern United States is 24 miles per hour and the mode is 33. This data could be affected by seasons and weather fronts.

Step B What state would you consider purchasing a wind turbine to generate energy for your family? Use the data about typical wind speed to help you come to a good conclusion. If I were purchasing a wind turbine for power I would consider the mode of wind power on the east coast as well as the spike in the east coast. The data supports a higher wind speed which would allow me to produce more wind power for my family.